

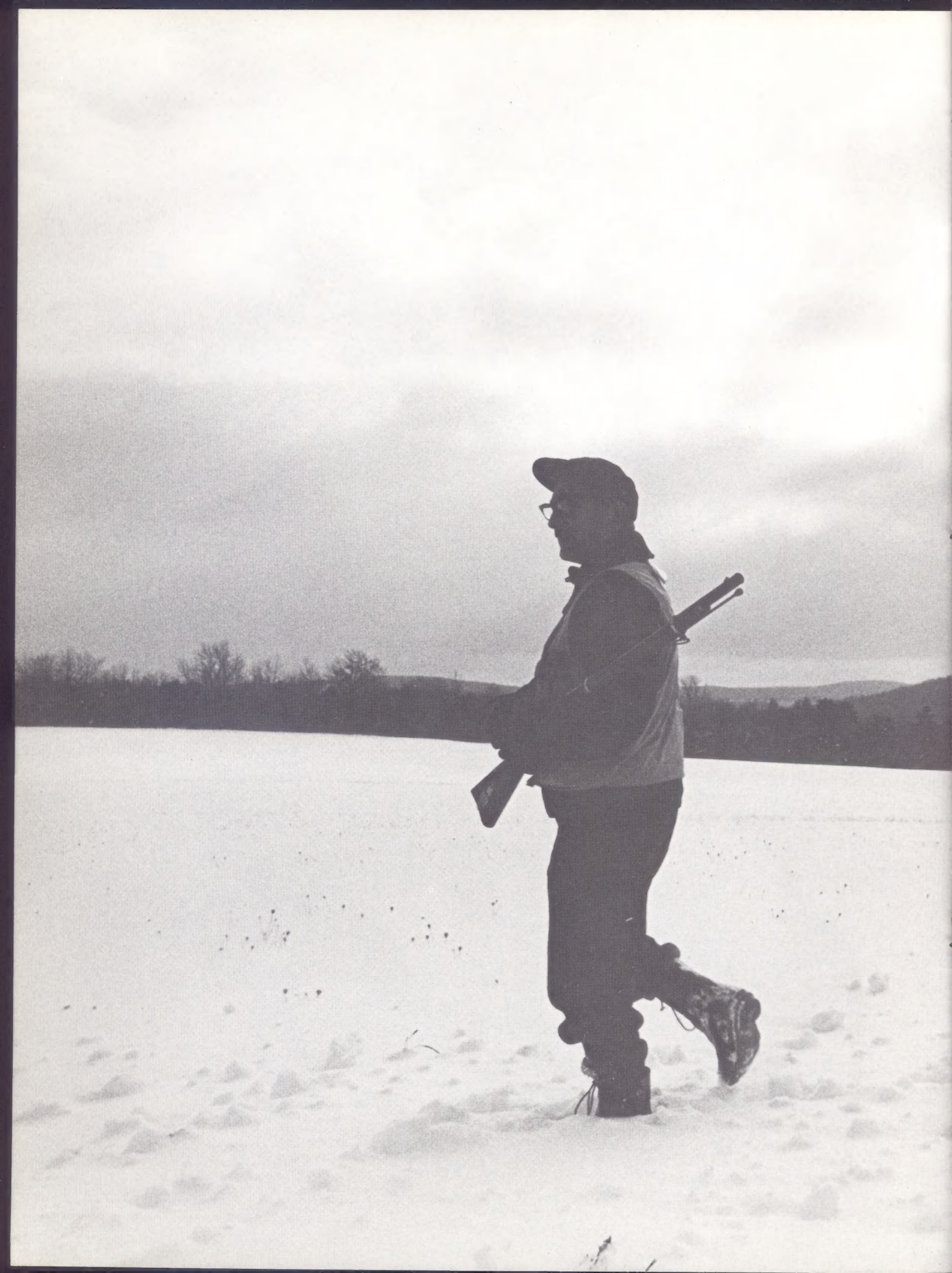
The image is a still life photograph set against a warm, yellow-orange background. In the upper left, a glass of orange juice sits next to a small bouquet of yellow flowers. To its right is a glass pitcher filled with white milk. In the foreground, a white bowl is filled with a cereal that consists of small, square pieces shaped like circuit boards, complete with intricate patterns of lines and dots. A silver spoon rests on a white plate next to the bowl. The overall composition suggests a theme of technology and daily life.

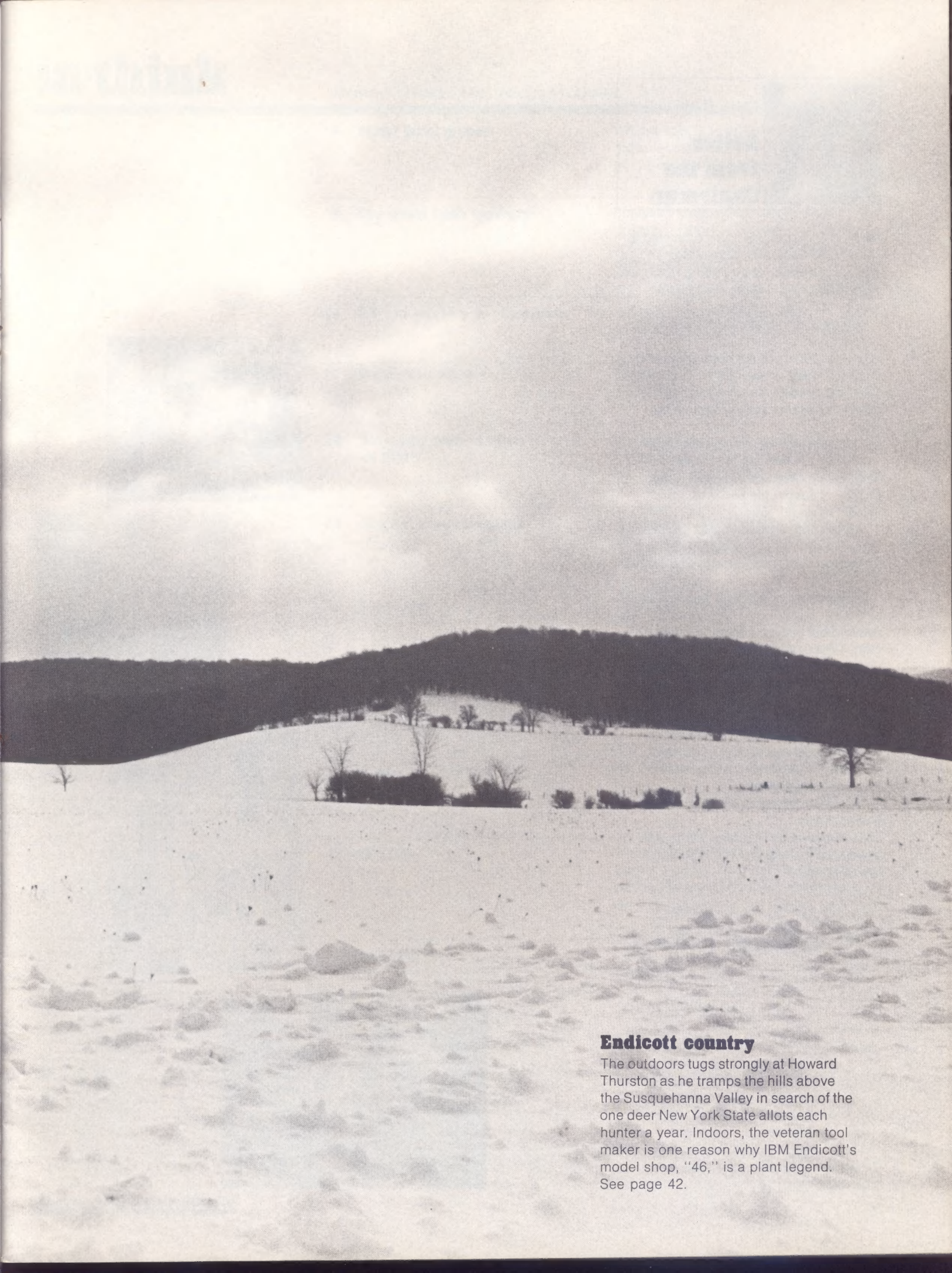
Think

January/February 1978

**'Honestly,
I don't start
the day with
a bowl of chips
for breakfast.'**

Women engineers.
Different? Yes and no.
How seven of them see
themselves and
their jobs.





Endicott country

The outdoors tugs strongly at Howard Thurston as he tramps the hills above the Susquehanna Valley in search of the one deer New York State allots each hunter a year. Indoors, the veteran tool maker is one reason why IBM Endicott's model shop, "46," is a plant legend. See page 42.



Letter from the Chairman

With "The Nutcracker" we completed a rather ambitious year on television in which we drew an encouraging response from critics and viewers alike on the quality of our programming.

Why this investment in TV? Because it enables us to reach out and tell many more people about our company and our products. Many viewers who write me tell me they enjoy the commercials almost as much as the programming itself.

But even the best commercials can only provide information or make an impression. What counts most is the quality of our people and the care with which we do our jobs.

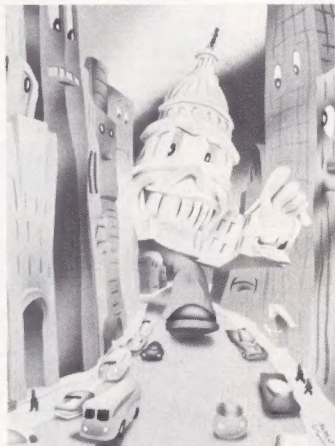
It's the engineer who cares greatly about the quality of a design. The man or woman in production who won't settle for less than the best. The marketing representative or systems engineer who won't let go of a tough problem until it's worked out to the customer's satisfaction. The customer engineer who juggles his personal plans to get flood-drenched equipment up and working again. The secretary who cares enough to insist that everything be letter-perfect.

It is how the world sees each of us, how it judges everything we do, that counts for more than anything else in what people think of IBM.

Commercials, yes. They're good for the business.

But how we do whatever we do will always be the very best commercial we can have.

Frank Cary



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Wow! What a Year

An all-time record breaker in gross income and earnings. An assessment

Early Friday afternoon, January 27, the U.S. economy edged over the \$2-trillion mark. Only a few weeks earlier, when IBM closed its books for the year, quarterly income for the first time broke the \$5-billion level. It was a whirlwind windup for the company's best year ever. World-wide gross income was up from \$16.3 billion in 1976 to \$18.1 billion. Net earnings were up from \$2.39 billion to \$2.7 billion.

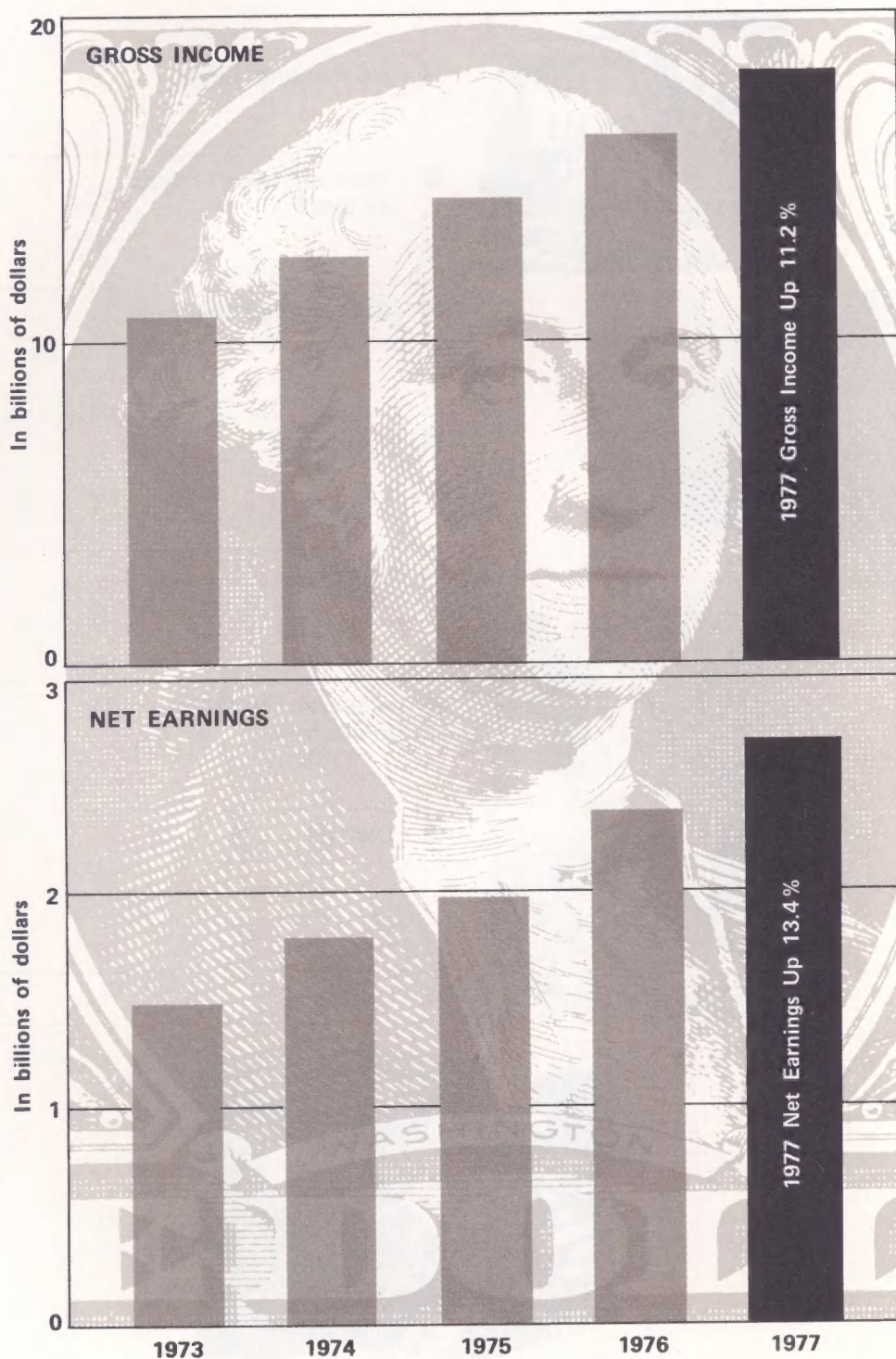
It took the United States two centuries to reach the first trillion dollars in Gross National Product. A little over seven years to reach the second trillion. Meanwhile, it took IBM 46 years to reach its first billion, in 1957. In the 20 years since then, that figure has multiplied 18 times.

One caveat, however, lest all this sound too euphoric: Inflation has ballooned those dollar totals substantially, especially during the last six or seven years. One billion 1957 dollars is the equivalent of \$2.2 billion today.

What accounted for IBM's extraordinary 1977 performance? Chairman Frank T. Cary attributes it primarily to an unprecedented "demand for our products in the marketplace." Customers, he says, view investments in data processing and word processing systems as a "premium investment." Why? "Because all kinds of enterprises are looking for ways to increase their productivity."

IBM President John R. Opel credits widespread economic improvement for the record-breaking year. And, indeed, once again, the business abroad accounted for roughly half the gross income. But, in addition, he notes that the single most important factor everywhere "is the spread of information technology throughout society—from offices to plants and from research laboratory to the local grocer" through the proliferating uses of computer terminals. In a word: demand.

As to 1978, the company in its earnings statement said it expected outright purchases to continue at a high level,



nt from three Group Executives on what kind of a year it was and why.

but added that last year's rate of increase was not likely to be sustained. If it is not, the statement continued, "period-to-period earnings comparisons will not be as favorable as they were in 1977."

However, as far as business volumes are concerned, Cary notes that "we have a very substantial backlog on our books, a very high rate of shipments and orders.

"We don't see any slack in demand," he says.

For a comprehensive look at why the business is going so well, read on.

Nineteen seventy-seven. It was the year the Jimmy Carters moved to Pennsylvania Avenue. It gave Britain's royal House of Windsor its first untitled heir. It crowned the Yankees with their first World Series title in 15 years. In one of the most dramatic diplomatic gestures in recent history, it took Egypt's top man to Israel. It also produced some of the coldest and hottest weather in living memory, as well as another blackout in the Greater New York area.

And it gave IBM its best year ever.

Sales were up at an unprecedented rate. So were the business volumes. Even the company population went up, with some 18,000 new employees swelling the company's total population to a record 310,000. In the Data Processing Division alone, gross orders in the U.S. more than doubled those of 1976, and the increase in net orders was two-and-a-half to three times what it was the year before. In the General Systems Division, within three weeks of its System/34 announcement in April, gross orders exceeded 50 percent of the total orders expected for the year. And the company hit an all-time record for typewriter production, worldwide.

These are some of the elements of a broad-canvas look at the business by three Group Executives: Dean R. McKay, Paul J. Rizzo, and George B. Beitzel, IBM

senior vice presidents who bear the responsibilities for three key business units through which the company conducts its business.

Under McKay, a senior vice president since 1971 and in his present job for the past six years, is the Data Processing Marketing Group. Rizzo, formerly IBM vice president of finance and planning, has headed the DP Product Group since 1974. These two Groups, headquartered in Harrison, N.Y., focus on the company's intermediate and large information processing machines—from the System/370 Model 115 up to the powerful 3033 processor announced last year—and their peripheral equipment. (Within the Groups are six IBM divisions: Data Processing, Field Engineering, Federal Systems, General Products, System Communications, and System Products.)

Beitzel, formerly general manager of the Data Processing Group, has headed the General Business Group since 1972. Based in White Plains, N.Y., GBG in the past year has seen phenomenal sales increases worldwide in a broad range of products, from typewriters and Copiers to office systems and low-end information processing equipment, such as the System/34 and Series/1. (GBG includes the General Systems, General Technology, Information Records, and Office Products Divisions, as well as General Business Group/International, which has marketing, service, manufacturing, and overall performance responsibility for General Systems and Office Products operations in 21 countries outside the United States.)

Looking at the DP complex, Rizzo says it had "a major turnaround in '77 and is off on a new growth curve." Leading its product line are the big processors announced last year—the 3033, 3032, and 3031. "When you consider all the equipment that goes along with those ma-


chines," says Rizzo, "1977 was far and away the best year in history in terms of orders. We've got a fantastic amount of business on the books. And this year we'll be shipping out of Poughkeepsie more than double the number of large processors we shipped in 1977."

As a dramatic example of how the company has been doing, he says, "the compute capacity of the new machines now on order is four times that represented by all the computers IBM has ever shipped. And we've shipped a lot of computers over the years."

Paradoxically, one of the biggest complaints is that even the new processors aren't big enough for the big customers. They want more and more powerful equipment. "So," Rizzo says, "no matter how much you hear and read about how good the small computer business is—and it *is*, there's no denying it—the big jobs still need those big machines." And that, he adds, is why the gross backlog of orders is more than twice as high as the company has ever had.

Orders for the System/370 Models 158 and 168 also continued strong, with an assist from the product line's new 3062 and 3052 attached processors. Another major achievement came last year with the intermediate equipment (Models 138 and 148) turned out by the System Products Division people in

This roundup from the Group Executives concentrates primarily on the business in the U.S. It does not include activities of the IBM World Trade Europe/Middle East/Africa Corporation, headed by Jacques G. Maisonrouge, nor those of the IBM World Trade Americas/Far East Corporation, headed by Ralph A. Pfeiffer, Jr. Those areas and that of Frank J. Cummiskey, who heads the General Business Group/International, reporting to G. B. Beitzel, were included in a report by Geoffrey D. Austrian in the November/December 1977 *Think*.



the Endicott plant.

"Behind these products," Rizzo says, "is a very complicated integrated technology system, and that's where their effectiveness begins. This technology comes out of the Endicott, Burlington, and Fishkill plants, where they're doing a great job in terms of cost. It's no longer just a matter of turning out the products—the boxes—themselves. You've got to have all that technology—the circuitry, the cards, the boards—that make those products possible."

What has happened throughout the marketplace, Rizzo points out, is that "customers are very anxious to get their data processing equipment as fast as they possibly can. So one must gear production to meet the demand at a much earlier point, once a new product

announcement has been made."

Rizzo also credits major accomplishments of 1977 to the General Products Division's people in San Jose, Calif., and Boulder, Colo., for their work on the 3350 large capacity file, the 3850 mass storage device, and the 3800 printing subsystem. Since customers are continually increasing their storage capacity, he says, "we've got to supply them to stay competitive, and the GPD efforts have allowed us to do just that."

It was also a good growth year for the retail, banking, and supermarket equipment. And yet another record was set by the System Communications Division people in Raleigh, N.C., and Kingston, N.Y. Their output was more than 50,000 display screens for the year, a 100 percent increase in deliveries over 1976.

As Rizzo says, data communications is one of the fastest growing areas—if not the fastest—in the business.

When Dean McKay is asked why business is so good, he says: "Our DP sales people across the country will probably give you three reasons. First, the economy has been generally sound. Second, our data base/data communications approach is really catching on. We started marketing it five or six years ago, and our customers are now using it more and more. And third, there's price/performance. Our products are being offered at unprecedented price/performance levels, and the result is that new business is opening up everywhere."

Group Executives

Rizzo, Beitzel, McKay. The trio to whom U.S. operating divisions report.



The company has also been announcing new products, and turning them out, faster than it ever has; and the equipment is more cost-effective than it's ever been. And that, says McKay, is another reason why the demand is there. As he is quick to point out, data processing is looked upon today in a new light. People used to consider it an added expense. Now they view it as a productivity tool and measure their investment in terms of the return on it.

"And they find they're getting it," McKay says. "Only two or three years ago, the use of a terminal might have been cost-effective only if it improved productivity 30 to 50 percent. Today, all you have to get is a productivity increase of 5 to 10 percent, and it will pay for the investment. The price of the

hardware is less than it used to be, and the salary of the person using a terminal is greater. So both factors work in our favor."

Because of the high demand for computing power, he adds: "We're putting out things like IPOs [Installation Productivity Options], which cut the manpower required to install some of the main software systems. Instead of 100 man-months of time, it's 5—or 10, at most. Those numbers are relative, by the way, not actual."

Software is a story in itself for 1977. It is spectacularly told in the experience of a big IBM customer—an oil company. With a good deal of new code and data base/data communications equipment, beginning some three years ago, this customer had reached a sort of

plateau of some 5,000 transactions a day. But last year, its people had become so proficient with the new equipment that they went over 20,000 transactions a day and are on the way to doubling that amount.

New concepts—in both hardware and software—are complex, says McKay, "and it takes customers time to understand them and then get into position to exploit them. That's what's been happening, and that's another reason why business has been so strong."

Much of this, he feels, is attributable to the increasing effect of distributed processing and networking, which allows the customer to lace together his data processing equipment. Thus, the users—whether they are engineers,

(Continued on page 46)

The great cash mystery

Do you have \$1,400 in cash lying around the house? If you're a family of four, that's what your cache should come to. But if you don't have it, who does? And why?

by George E. Cruikshank

Cash—folding money—held by individuals in unbelievably large amounts is one of today's financial mysteries. Bankers in and out of Government are puzzled by what might be called The Case of the Overstuffed Wallet. They know who the culprits are—millions of Americans, and possibly others. But what befuddles them is the motive. Why is all that cash piling up when money substitutes like credit cards and checks are readily available?

The amount of paper money and coin in circulation (which excludes amounts held by the U.S. Treasury and Federal Reserve Banks) has risen sharply year after year and, at more than \$93-billion, now stands at a new high.

George E. Cruikshank is a vice president of Morgan Guaranty Trust Company of New York.

Individuals hold the great bulk of this cash—probably 85 percent to 90 percent of it. The rest is held by financial institutions (principally commercial banks, which hold about \$9-billion in cash) and by businesses and governments (mostly as "till" money).

Currency outstanding amounts to \$432 for each man, woman, and child in the nation. As recently as 1960, per capita cash holdings were only \$177. Compared with even earlier periods, today's currency per person is spectacularly higher—despite the sharp increase in bank checking accounts and the meteoric rise in the number of credit cards (500 million outstanding at latest count). In the period from 1892 to 1917, for example, per capita currency holdings fluctuated within a range of \$14 to \$22. Between 1918 and 1939, the range was only \$27 to \$46. Even after allowing for inflation and for the larger population, so-called real per capita holdings of cash now are more than 50 percent higher than they were in 1939.

There are other oddities in the money mystery. After allowing for cash held by businesses, governments, and banks, per capita cash holdings amount to roughly \$365. A typical family of four thus would have at this moment more than \$1,400 in cash in pockets, wallets, and handbags. Such holdings obviously are quite large for the average family. That indicates that very large amounts—in the thousands—are being held by a large number of households. Why hold bundles of cash that could be lost, stolen, or destroyed and that earn no return for the holder? After all, at today's rates on savings deposits (over 8 percent on a time deposit), money doubles in about nine years. Holding cash, thus, is a considerable sacrifice merely to collect engraved pieces of green paper.

Puzzling, too, is the pattern that has developed in the rise in large denominations of currency. It is the big bills—\$50 and \$100—that have shown some

of the steepest rates of increase.* For instance, more than \$27-billion in \$100 bills is now outstanding, an increase of more than 350 percent since 1960. At a time when in many places it is increasingly risky to flash a big roll, why the heavy demand for big bills?

Actually, the money detectives are not totally in the dark. There are some clues that explain part of the great cash mystery.

Least puzzling is the fast rise that has taken place in coins in circulation, now valued at \$9.5-billion, well over double the amount in the mid-1960s.

Gresham's Law—"bad" money drives out "good" money—is a partial explanation. A rising price for silver in the Sixties made old coins (90 percent silver, 10 percent copper) worth more intrinsically than their face value. Silver coins rapidly disappeared into private hoards. The U.S. Mint has had to produce millions of new coins to take the place of the silver coins.

Collectors—from professionals to small fry with piggy banks—siphon off large numbers of commemorative coins (the Kennedy half dollar, the Eisenhower dollar, the Bicentennial series). Collectors will have a field day if Congress goes along with the latest coin proposals: to eliminate the present half dollar, to reduce the size of the dollar coin, and to eliminate the penny.

Rising local sales taxes increase the need for coins. So, too, does travel by automobile (growing despite the energy crunch) as motorists toss coins into

* The really large-denomination bills—\$500, \$1,000, \$5,000, \$10,000—are no longer being printed. In July 1969, such bills began to be withdrawn from circulation when received by Federal Reserve Banks or the U.S. Treasury. The face value of these bills outstanding, however, has declined slowly—down only \$202-million (from \$578-million) since 1960. People who have these jolly green giants keep them out of circulation (out of the banking system, anyway).





receptacles at bridges, tunnels, and turnpikes. Finally, the vending machine industry, dispensing everything from combs and candy to soup and cigarettes, gobbles up billions in coins.

The steep rise in the hoarding of paper money—up 175 percent since 1960—is more difficult to analyze. One reason, however, is obvious: inflation. With higher prices, more cash is needed for everyday expenses—to buy a paper, take a bus or taxi, buy lunch, get a haircut. But the rise in currency has far outpaced the rise in the cost of living.

Tax evasion is cited by some experts as a contributing cause of the rising demand for cash. Gamblers, racketeers, white-collar professionals, blue-collar "moonlighters"—all types are said to demand cash so that there will be no record of their dealings. Surely some tax evasion is going on via cash transactions. But people who demand large amounts of cash leave themselves open to being turned in to tax authorities by informers who want to collect the 10 percent reward on tax cheaters. In any case, money analysts doubt that tax evaders account for any significant part of the rising demand for folding money.

A certain amount of U.S. currency—difficult to quantify—is circulating abroad. Some of these dollars are used as transactions currency in foreign lands, where they circulate along with local money. Then, too, nationals in many foreign nations prefer to hold sums in dollars, trusting U.S. currency more than their own. Undocumented workers (illegal aliens) visit post offices, telegraph offices, and border crossing points every day to send money home. Estimates of that dollar drain—in effect, earned foreign aid—range from \$3 billion to \$10-billion a year.

There is also thought to be a large amount of U.S.-owned currency, in big bills, that derives from illicit operations—for example, the international drug traffic. And, as recent newspaper

stories have reported, certain foreign government agents have been doing their part in pushing up the currency numbers. They are reported to have stuffed briefcases with crisp packets of U.S. \$100 bills for passing out to those in positions of power in their countries.

Despite all those theories and conjectures, The Case of the Overstuffed Wallet remains essentially unsolved. Conceding that a certain amount of cash is desired to cover up illicit operations or to cheat tax collectors, the sharp increase in currency can hardly be explained by such evasions unless one assumes that people have gone bad on a mammoth scale. Happily, there is no corroboration for such a bleak assessment.

Currency is held for two major reasons: to pay for goods and services, and as a store of value. As to the former, money substitutes—in the form of checks, credit cards, charge accounts, traveler's checks—are abundantly available, considerably safer than cash, and usually cheaper for large transactions. Safer, certainly: When a traveler's check is lost, stolen, or destroyed, it can readily be replaced. But as Karl Malden keeps reminding us on TV, hundred-dollar bills cannot be. And a transaction by check costs the same, whether it be for \$5 or \$500,000.

As to the latter—money as a store of value—inflation has made heavy inroads on cash holdings. The return from risk-free market investments, such as

Oodles of cash. But who needs it?

Your wallet may or may not be stuffed with a statistically proportionate share of that \$432 in cash in circulation for every man, woman, and child in the United States.

But if it isn't, don't fret. For if you're like most people today, you're well-stocked in credit cards, although perhaps not to the extent of a gentleman on the West Coast who has more than 800 cards to his name.

Today, some 500 million credit cards are stashed away in the purses and wallets of American consumers. And each time we pull one out, chances are that our transaction will be processed through an IBM data processing system somewhere.

Say, for example, it's one of the

venerable American Express Company's 8.4 million cards. Whether it's being used to buy a snow shovel, a plane ticket, or crepes suzette, the purchase information will be logged and processed by IBM System/370 Models 148 and 158 at either of American Express's two major computer centers in Phoenix, Ariz., and Fort Lauderdale, Fla. The receipts, or Records of Charge, are stored at one of those centers, and then, on a cardholder's particular cycle, the receipts for the cycle are sorted into customer order. In addition, there's an itemized statement of every receipt, plus the cardholder's covering bill.

And if it's a bank credit card, such as Visa or Master Charge, an IBM 3608 point-of-sale terminal may be involved somewhere. The First National Bank of Chicago, for example, with \$20-billion in assets, is one of the top 10 banks in the United States. Its Visa card, held by 2.2 million people, can be used at 35,000 locations in the greater Chicago area. At present, 200 IBM point-of-sale terminals at 125 stores are on-line to one of the bank's System/370s—to authorize a

U.S. Treasury obligations or from an insured bank savings account, can offset dollar depreciation owing to inflation. Despite that elementary financial truth, many people apparently prefer bundles of cash under the mattress, in the freezer, or in a jar under the old apple tree.

It must be that many people don't want to tussle with deposit slips, or they don't trust banks (there are still people alive who remember the failures of the 1930s), or they don't want anyone to know the size of their savings. Too, some people undoubtedly like to see and feel their wealth. Newspapers reported recently the sad case of an Indianapolis widow who was murdered for her money. Inside her house police found

\$5-million in cash the robbers missed.

Economists have estimated that one-third of the currency outstanding is in active use by individuals and businesses. The other two-thirds is said to be in hoards. If true, roughly \$60-billion is being deliberately stashed away in cash. Apparently, the great bulk of that amount represents nothing illegal. It represents, rather, a decision by people to keep some portion of their savings (in some cases all of their savings) in the form of cash. A plausible theory, but no one knows for sure.

One thing is clear, though: The U.S. Treasury is delighted. The \$60-billion in cash hoards represents an interest-free loan for the Government. At a recent average Treasury borrowing cost of 6.4

percent, the Government is saving some \$3.8-billion annually in interest costs. And that, as anyone will readily concede, ain't exactly peanuts. □

Currency by Denom- ination	Millions of dollars 1960	1977*	Percent Change
\$ 1	1,533	2,758	79.9
\$ 2	88	636	622.7
\$ 5	2,246	3,765	67.6
\$ 10	6,691	10,454	56.2
\$ 20	10,536	29,827	183.1
\$ 50	2,815	8,998	219.6
\$ 100	5,954	27,021	353.8
\$ 500	249	171	- 31.3
\$ 1,000	316	199	- 37.0
\$ 5,000	3	2	- 33.3
\$10,000	10	4	- 60.0
Total	\$30,441	\$83,835	175.4

*End of March.

card when it's presented and to collect data. During the next several years, First Chicago will be installing up to 5,000 more of these terminals in 2,800 retail outlets.

In Birmingham, Ala., the First National Bank—with \$1.2-billion in assets—uses 12 IBM 3614 automated teller machines on-line to its System/370 equipment. Among its depositors and accounts, the bank numbers 70,000 Master Charge cardholders.

As one bank executive puts it: "Without computing equipment, the credit card business just couldn't even begin to cope."

It all began in the Twenties, when a few firms—oil companies and hotels, for example—began to issue charge cards to steady customers. The real credit card boom wouldn't come, however, until Diners Club touched it off in 1950.

After that, the deluge.

Today, out there in consumerland, those 500 million credit cards finance some \$80-billion worth of annual spending. The big three of the travel-and-

entertainment cards are American Express, Diners, and Carte Blanche. Banks came into the field in 1959 with BankAmericard, renamed Visa last year. The other major bank card is Master Charge, which has grown from 5.7 million cardholders in 1967 to 40 million today. In 1976, one out of every four American adults used Master Charge cards to the tune of some \$13-billion. (Together, these two bank credit card systems do a business volume amounting to nearly \$40-billion a year.)

While U.S. credit cards are widely accepted in Western Europe, a European contender made its debut last spring—the Eurocard. It is sponsored by the West German banking system with its 45,000 branches, and to qualify for it, one must earn at least 11,750 deutsche marks (\$25,000) a year.

The credit card deluge shows no sign of subsiding—and small wonder. With one of those 2-by-3-inch slices of plastic one can "buy" practically anything, in one place or another:

- food, clothing, and shelter
- taxi rides

- an education—at Emory University in Atlanta, Ga., for instance
- works of art
- a lift on a ski tow
- a trip around the world
- even money itself

So the cards are played, ad infinitum. In the view of a member of the House of Representatives Banking Committee, we've become a nation of credit card addicts.

That's stretching it somewhat. But according to a recent issue of *Time* magazine: "Since 1950, while the U.S. population has grown 44 percent, the total of consumer installment debt outstanding has multiplied more than 12 times." And that doesn't include home-mortgage debt. In the past four years alone, credit card purchases have jumped from 10 percent to 17 percent of all installment borrowing.

Indeed, the credit card is so pervasive in this society of the Seventies that it's even found its way into the peerless arbiter of who's who and what's what—the *Encyclopaedia Britannica*.

—EDWARD F. PIERCE



All the world's a classroom

by Martin J. Hamer

What does Barbara Atwood, a 30-year-old Tucson lawyer, have in common with Billy Hunt, a 10-year-old pupil at the W. V. Whitmore Elementary School in Tucson, Arizona? They both used a Reading Laboratory® kit published by Science Research Associates, Inc., to improve their reading skills.

This year marks the 20th anniversary of the Reading Laboratory. It was SRA's first venture into instructional materials for schools, and though the Chicago-based IBM subsidiary has published hundreds of other programs, books, and tests since then, the Reading Laboratory is still a best-seller.

This kind of long-term success is uncommon in the educational publishing business, where yesterday's popular

approach to reading is sometimes today's reason why many children cannot read. SRA began in 1938, when the late Lyle M. Spencer, a Chicago educator, formed the company to publish school career guidance materials and tests and training materials for industry.

In time, SRA broadened the testing side of its business to include educational assessment, and that led logically to the development of the Reading Laboratory to attack a wide range of reading problems revealed by the test results. By the early 1960s, SRA, then a privately owned company, was one of the leading educational publishers in the country. In 1964, it became part of IBM. Today, SRA has companies in



Canada, the United Kingdom, Australia, and France; some 900 employees; and nearly 2,000 products for all school levels in reading, math, social studies, health education, and business—ranging from materials that teach the metric system to sophisticated college texts.

Another major program, the Distar® system for learning arithmetic, reading, and language, recently gained national acclaim after a study by the U.S. Office of Education singled it out as a program that produced significant gains for children learning basic skills.

Even though both SRA and the Reading Laboratory may be getting on in years (it is SRA's 40th anniversary), there is no sign of a mid-life crisis in either. The Reading Laboratory's ma-

terials for the fourth through sixth grades are undergoing a major revision. Skills (like cause and effect, finding the problem and the solution, and sequence of results) previously taught in sixth grade "are now being taught in fourth," says Glenn Phillips, editorial manager. "We're also eliminating American idioms from the exercises so that the kit will be more attractive overseas."

"Overall, we've had another fine year," says SRA President Dick Giesen. "There's a surge in education to get back to the basics—or, as we like to put it, go forward to the fundamentals. And our diversification into the college and consumer product areas has significantly stimulated our business."

Initial sales of its first consumer prod-

uct, Skills Ladder™ (math drills), were five times those of the school edition. Another consumer product, the SRA Greenhouse™ (how to raise 400 different indoor and outdoor plants), is being introduced this year.

Even though elementary school enrollments, the heart of SRA's present business, are slackening, the company's future looks brighter than an Arizona sky. While standing primer to primer with the best in the educational publishing industry, with a time-tested product that every newborn may eventually use, SRA has a unique entree into the home market. The Reading Laboratory has been around so long, Giesen says, "there's hardly a young parent who doesn't know us." □

Women Engineers. Brainy, ye





s. But don't label them fragile.

by Claire Stegmann

Of world occupations outside the military, engineering has been, perhaps, most universally identified with the male. True, a female chemical engineer named Marion Rice Hart was in the Class of 1914 at the Massachusetts Institute of Technology. It was five years later that a woman first received a master's degree in electrical engineering from M.I.T. And women have been included among Georgia Tech's "rambling wrecks" for a quarter of a century. Still, as a 1977 National Science Foundation study concludes, although "the science potential for both males and females in high school is about equal . . . relatively few women enter careers in science." And of these, only one out of 10 becomes an engineer. As recently as 1974, there were only 5,000 female engineers at work in the U.S., out of an engineering total of 999,000.

Yet engineering job opportunities have never been better. The Bureau of Labor Statistics predicts that, while the number of graduates will exceed available jobs in most fields by 1985, positions in engineering will go a-begging.

Among IBM's 376 women engineers, 110 have engineering degrees. The others hold degrees in disciplines like math, chemistry, or physics.

What are they like, these image-shattering females? Determined, certainly, and practical. Like pioneers everywhere, they share common goals with their own kind, more perhaps than women graduates in other fields, according to one study. They tend to marry other engineers. Otherwise, as these seven engineers at IBM prove, they're a lot like everybody else.

Well, maybe not all of them. That early M.I.T. graduate, Marion Hart, took up flying when she was 55 and, at last reports, now well into her 80's, was making periodic trans-Atlantic hops in her Beechcraft Bonanza.

'It's a stereotype that women scientists only study. I ski, design my clothes, write short stories.'

Giovonnae Anderson is on leave from the General Products Division in San Jose, Calif., to complete the requirements for a Ph.D. at the University of California at Davis. She's been with IBM since 1972.

I'm studying for my doctorate here at the University of California at Davis, under IBM's Resident Study Program. But I go into the office once a week to use the computer and keep up with what's going on in bubbles. That's my field: magnetic bubble memory. It's been the highlight of my IBM career.

I went into bubbles from the process end and progressed into sensor and switches design. I have designed some chips, and I've got a couple of patent applications out.

It delights me when people are surprised that I'm an engineer. I have some friends who just freaked out when they found out what I do for a living. They're over it now. It breaks down the stereotype that women scientists don't do anything but study. Not me. If I didn't take a couple of days off a month, I'd go crazy. I ski, play tennis, bicycle. I also design my own clothes and write short stories for my own amusement.

My husband is an engineer for a small engineering company in Sunnyvale. I have a brother who's a professor of mathematics at Temple University in Philadelphia. Our dad was an Army engineer.

When I entered Hampton Institute in Virginia back in 1966; I was one of two female double E candidates. The other girl got married, and I transferred to physics in order to work with solid state



devices. By the time I got to Cornell, for my master's, it was 1970, and there were three or four women in the engineering graduate school.

In 1975, the National Science Foundation asked me to attend a conference on career development for minority women. I've always enjoyed working with young people. Here at Davis, I tutor some of the

younger engineering students. In San Jose, a group of engineers, most of them from IBM like me, formed a Black Science Club. We taught junior high school kids.

My thesis? By implanting ions into field effect transistors, you can drastically change their characteristics. I'm doing some new things with that old trick.

'I wasn't sure it was the right field. Now I'm pursuing a master's. Engineering's been good to me.'

Beverly Petras joined IBM in 1972 after graduating as an electrical engineer from the Rochester Institute of Technology. She's with the System Products Division in Endicott.

I was determined to be an electrical engineer, but I wanted to make sure it was the right field for me. So I went to a community college first, one with a good electrical technology curriculum. Graduated top of my class and went on to the Rochester Institute of Technology. Now, as my work load permits, I'm pursuing a master's degree in engineering at Syracuse University.

I've always been more interested in hardware than software, and since I came here from FSD in 1975, I've been involved in logic design and test activity for the 5211. That's the new printer IBM has announced for the System/34. We use various types of electrical test vehicles to see that the hardware in the printer is operating according to the logic in the main control unit of the machine.

When we were in ship test, I was the engineering coordinator for both electrical and mechanical problems and worked with a number of different groups. I decided then that I really prefer working with people. And now I'm a new manager. I won't be working directly with the hardware, but I'll be keeping close tabs on the technical end of the business. Engineering has been good to me, and I'm looking forward to my future with the company.

My husband is also an electrical engineer, for IBM Owego. We have an old



house in Endicott that was very sadly misused, and we've been slowly remodeling it, a room at a time. One advantage our profession gives us: We can put new electrical outlets wherever we like. I have other interests, too: horseback riding, needlecraft, and cooking.

'I felt isolated, so when the children were 3, I started looking for a job outside my home.'

Pat DeGeest is an electrical engineer from the University of Washington. She's been with the Office Products Division in Austin, Texas, since 1974 and is now working on Office System 6.

I just transferred from manufacturing to the product development area a little while ago, so I'm still on a learning curve. We write the program that enables the Office System 6 and some unannounced products to do self-diagnosis and alert the operator when something needs repair. It takes a fair knowledge of the hardware plus a knowledge of programming. I'm taking an IBM Voluntary Education course in programming to supplement the high-level languages I learned in college.

I got interested in engineering through amateur radio. Learned Morse code



when I was 13 and got my general class amateur license. Friends of my father—he was a technician for Boeing—encouraged me. When the time came for college, it was apparent to me that there were more job opportunities in electronics and engineering than in other fields.

At the University of Washington, I was the only woman in a graduating class of 300 electrical engineers. Sometimes I used to wish I could blend into the background.

During college I worked part-time at Boeing and joined that company after graduation. Worked on 707 aircraft communications systems and missile circuit cards. I married, had twins, and for about three years stayed home. In my spare time I ran a TV repair store. But I felt isolated, so when the children were 3 I started looking for a job outside my home. Both my husband and I decided we wanted to leave the Seattle area. We looked around and settled on Austin.

We love it here. The climate. The people. And we're both wild about our jobs. He's head engineer for a boat construction company.

We live in the country, have a house and 13 acres. On weekends we take our Doberman to dog shows in a Dodge van we bought recently. We've carpeted it, and it's very comfortable. I haven't done anything with ham radio for quite some time, but as the children grow older and get into their own pursuits, I'll probably have time for it again.



'I do a lot of paperwork. We can't see things with the naked eye, so we have to document carefully.'

Priscilla Vurrage is a chemical engineer in bipolar photo manufacturing with the General Technology Division, Burlington, Vt. She has her degree from M.I.T. and joined the company in 1963.

The unusual woman in my family has been the one who dropped out of college to get married. I have a cousin who's a city planner; another has her M.D., specializing in cardiology; another was an assistant football coach. My father, a doctor, took his undergraduate work in engineering. And my grandfather was an engineer. So no one discouraged me. Except the colleges. I used to joke that I went to M.I.T. because it was the only school that would take me. Twelve of the 15 that I applied to didn't take women. I have my degree in chemical engineering, with a minor in mechanical.

There are two common types of transistors: FET and bipolar. Each has its own specific uses. I'm in bipolar photo manufacturing engineering, and work

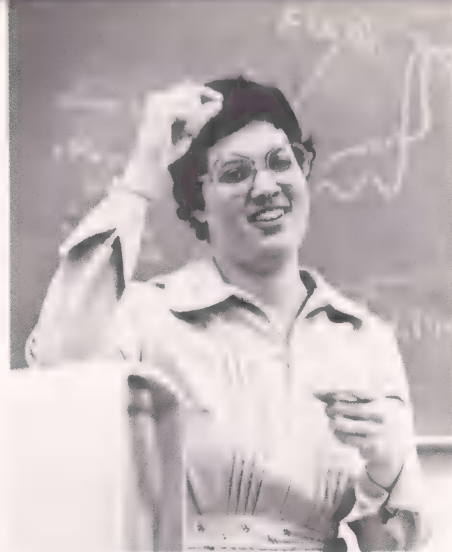
with wet chemical processes. We clean the surfaces of semiconductor wafers before applying photosensitive patterns. We apply a chemical photo resist, expose it, and then develop the exposure, like a regular photo. We also use a wet process to etch away the insulating oxides, nitrides, and quartz layers, as well as the metals we don't want on the final pattern. And we remove the photo resist with chemicals, to make way for the next process.

I do a lot of paperwork—logistics to get lots and lots of new part numbers on the line. Since we can't see the things we manufacture with the naked eye, we have to document everything very carefully to make sure that what comes out the end of the line is what we want.

For the past 10 years, I've also taught technical writing and speech in IBM's educational programs.

My husband is an IBM engineer with an applied physics degree from Manchester University. We both began our IBM careers in East Fishkill. When we moved to Burlington, in 1967, I was manager of technical communications and engineering publications. Then we adopted children—we have two: Annie, 6, and Michael, 7—and I went back to engineering.

Incidentally, I grew up in the Catskills in a tiny little town called Margaretville, named after the mother of Elizabeth Cady Stanton, the woman suffrage leader. One of my father's patients was a member of the Metropolitan Opera's corps de ballet, and she offered to give me dancing lessons to pay for an appendectomy. I took modern and classical ballet, then got into tap and square dancing. Now, I teach a class in Scottish country dancing one evening a week. I belong to the Montreal chapter of the Royal Scottish Country Dance Society. Every now and then the group gets together for a formal dinner dance. The ladies wear evening dresses, and the gentlemen wear kilts.



'I was the first woman engineer in my group. Others were more aware of it than I was.'

Peggy Galkowski was a new M.I.T. graduate in 1974 when she joined IBM. She's with the Federal Systems Division in Owego, N.Y., where she helps design defense systems for the U.S. Strategic Air Command.



'I figured engineering had to be easier than German. So I switched. And it was.'

Sheri French develops tests for System/34 microcode at the General Systems Division in Rochester, Minn. She joined IBM in 1975 after receiving a degree in electrical engineering from Purdue University.

When I was in the fourth grade, back in Morrison, Illinois, I saw the word *mathematician* and decided that's what I wanted to be. Later, at Purdue University, I was a math major for two years until I found out that to graduate I'd need a foreign language. I figured engineering had to be easier than German. So I switched. And it was.

I'm in systems assurance and have been testing the microcode for the System/34. As soon as a new system is

in the planning stages, we get involved. We watch it through development, learn what it's supposed to do, and develop programs to test things out before it's announced.

As I tell the college freshmen I address periodically, an engineer isn't just sitting at a desk designing all day. A lot of time is spent in communicating and doing paperwork. I like to think I've proved myself as an engineer. I'm treated just like one of the guys.

I went out one day about a year-and-a-half ago and bought myself a motorcycle. Just felt like it. Of course it saves gas, but mainly it has the powerful attraction for me a convertible has: I like to smell the clover. I drive it back and forth to work and sometimes on ski club trips.

I took flying lessons for a while, but they took too much time. All of a sudden it was summer and I wanted to play tennis. I also belong to the IBM pistol club. We practice out at the police range.

I live alone in a duplex. I'll probably marry and have a family someday, but I'm not out with a butterfly net. My next career step is to get into management.

Our department designs defense systems that locate radios and other emitters. Right now we're testing a system at the Strategic Air Command base in Rome, N.Y. I helped develop some of the location algorithms, and for the past few months I've been going up to Rome every other week for the flight tests.

I don't actually fly in the planes. I'm at a control station where the computers are located. During the flight tests, planes, flying in orbits, send received signals down to the ground. These are recorded on tape. At the same time, our navigation group is continuously measuring the aircraft positions and velocities, which are needed for the location algorithm. After the flight, the recorded data is processed by the location algorithm to determine accurate locations of the emitters. Then we analyze the results. The tests involve a lot of data analysis, and we've got a room full of computer printout. The system has been very successful.

I have my master's degree in electrical engineering from M.I.T. I started out in math but decided it was too theoretical to make a career of. Of the courses I took, the math and signal processing courses are most directly applicable to my work. I remember very few details from the

other electrical engineering courses, but I use many of the techniques for problem-solving.

Here at IBM, I was the first woman engineer in my group. I never thought much about being different or unusual because I was a woman engineer. Others were more aware of it than I was. Certainly I felt uneasy at the beginning, because I was starting a new job.

My father's a solid state physicist with IBM in Fishkill, N.Y. My husband is a software engineer, also in FSD Owego, but not in my area. At home, we keep busy with outside interests. We like to make picture-taking trips to the mountains or into Binghamton to photograph unusual architecture. We also ski and, in the summer, go swimming every day, no matter what the weather.

I hope to become a senior engineer or a lead engineer for some system.

'Being from a family of professional women, I saw nothing strange about an engineering career.'

Despina Boinodiris was born in Greece. She received her degree in electrical engineering from the University of Florida and joined IBM in 1968. For the past two-and-a-half years she has been with the System Communications Division in Raleigh, N.C.

When I attended college at the University of Florida, engineering was not considered a field for a girl to enter. Being from a family of professional women, however, I saw nothing strange about it, although my advisor felt differently. My mother was a science teacher in Greece, where I was born. Two of my four sisters have master's degrees in physics, another has

Think



a master's in chemistry, and my younger sister is a junior in engineering.

My job responsibilities in the past nine years have been in designing test equipment, printer electronics development, and, recently, 3287 printer terminal development.

In 1976, I was chosen as the IBM Corporate Representative to the Society of Women Engineers, which is a technical educational service organization. I encourage IBM people to become involved in seminars and workshops, as well as career guidance activities. The society is concerned not only with the professional development of its members, but also with educating students and parents

to the rapidly increasing career opportunities available to women in engineering and the sciences. Last summer, I served as a consultant for a National Science Foundation pilot project, designed to encourage female students to consider engineering and science careers.

Since my husband, Steve, is working for his doctorate degree under IBM's Resident Study Program at North Carolina State, most of our spare time is spent enjoying our daughters, 5-year-old Phaedra and Ismini, 4 months. □

'Now why didn't I think of that?'

If you had, there'd be money in your pocket—like the \$40-million awarded for employee ideas.

by Martin J. Hamer

How long has it been since you've had a pocketful of windfall—you know, that easy-come money, there when you least expect it—good for a splurge on something you might otherwise never do or buy?

Last year, the wind blew right for close to 20,000 IBM employees worldwide. Together they shared in a bonanza of over \$3.5-million from the IBM Suggestion Plan, better known as Ideas for Improvement. The biggest award was over \$25,000; the average was \$137; and there were more than 300 of \$1,000 or more. Most awards are based on 20 percent of what an idea saves the company in actual net material and labor during the first year of use.

Like everything else under the sun, there's nothing new about suggestion programs. Soon after the turn of the century, at the beginning of the great steamship era, competition led William Denny, a shipbuilder on Scotland's famed River Clyde, to introduce the first recorded system of rewarding employees for suggestions. Hard-pressed by British and American shipbuilders, Denny went to his employees and offered them an incentive of a "shilling or two" for ideas that would improve

production in the shipyard.

Since then, the idea of rewarding employees for ideas has become an institution. There is a National Association of Suggestion Systems, to which many corporations, including IBM, belong. And there are a number of private organizations exclusively devoted to helping people come up with ideas.

For hundreds of thousands of employees here and abroad—American industry is not alone in this—suggestion plans have brought an occasional boon; for some, a once-in-a-lifetime jackpot. Last year, in the United States alone, some 300,000 men and women from more than 200 companies shared in payouts of an estimated \$34-million.

Since 1928, IBM employees have won over 600,000 awards in the company's program, totaling more than \$40-million:

- Over 100 have won \$10,000 or more.
- The top award of \$75,000 has been won six times.*
- Employee ideas have saved the company more than \$200-million.

While many ideas require an engineering background, just as many others are simple, commonsense improvements. More often than not, they come from an employee who has worked in a job long enough to decide there must be a better way.

Taldena Zacharias, a field engineering training specialist in Des Moines, won \$8,000 for suggesting that the course and order number on training manuals be printed on the front as well as the back cover. It saved time wasted in flipping the books to find the number when filing or assembling sets.

Steve Schult, an administrative account specialist in Milwaukee, won \$13,105 for suggesting that contracts for ordering customer independent-

study programs be reworded so that they could be applied to future orders.

John Lawrence, a product analyst in Dayton, N.J., won \$6,300 for eliminating packing filler from shipping cartons. With 35 awards in 18 years, he's now won over \$15,000.

Jack Ackerman, a retired Office Products Division administration employee, probably holds the IBM record for coming up with ideas. Beginning early in his career, he garnered some 1,000 awards worth over \$65,000.

Even though it's not known why some people get ideas more frequently than others, there is general agreement that idea-people have several things in common.

"They are mental joggers," says psychologist Dr. David Campbell of the Center for Creative Research in Greensboro, N.C. "They like offbeat concepts. Ask one what would happen if people had an extra thumb, and you'll get an answer like, 'It would be easier to throw a curve ball.' And they often have several skills, which may account for the variety of solutions they bring to a problem."

The President of Princeton Creative Research, in Princeton, N.J., Eugene Raudsepp, says: "Creative people can be depended on for the unusual. They can give you 25 clever ways to use an ordinary brick—everything from a door stop to an insulator under hot dishes. They prefer the complex to the simple—don't ever ask one of them for road directions. And they can leap from one notion to another without pause for thought."

There's more. "They're hardworking, independent, tough, curious, and playful," says Dr. Campbell. "They're unconcerned about what others think of them. They're interested more in concepts than in details, and they're good communicators."

With 33 awards in his pocket, Bob Rentfro, an IBM senior customer en-

*Three in the U.S.; one each in Canada, Austria and Germany. Two of the U.S. awards were joint.

George Zdanis, a field engineering specialist in Hartford, split \$2,180 with a co-worker for reducing the number of tools shipped with the 3890 document processor. He bought a new wardrobe.



Eveline Hilman, an administration specialist in Brooklyn, won \$1,665 for improving a riveting operation. She made a down payment on a brownstone.



Bob Rentfro, a senior customer engineer in Oakland, Calif., has won close to \$10,000 with 33 awards. With each award, he buys the family a gift and puts the rest of the winnings into stocks.



gineer in Oakland, Calif., fits this description well. Apparently driven by the zest of matching wits with the way things are done, and his confidence that there is money to be made from suggestions, he increased his income last year by \$4,500 in award money.

In the 14 years he's been with the company, Rentfro has earned close to \$10,000 in award money, by running a kind of mini-idea factory in his home. In a special area where he retreats to dream up ideas, he keeps a three-ring binder for new notions; another for suggestions submitted. Since an idea must sell itself, he reads books on clear writing, and to keep himself alert to opportunities, he uses a set of self-developed guidelines.

The wellspring of Rentfro's talent is deceptively simple: "Whatever the task, I ask myself, 'What would a new employee think of the way it's being done?' And how would I explain to my wife why it's being done this way?"

Last May, he noticed that a vendor

was supplying a small, snip-top vial of expensive and potentially harmful adhesive without a replaceable cap. He suggested one, and won \$2,695 for improving safety and reducing waste.

"A stroke of luck," some people might say. Or they might moan: "Now why didn't I think of that?" But whether an idea is simple or complex, the creative work involved is often the same.

In 1970, Edmund Birkner—now an information systems manager in Vienna, Austria—earned \$75,000 while working as a systems analyst and programmer. He suggested that vacuum switches (monitoring air flowing through filters in a disk-storage unit) be replaced by a single gauge. The results? Less downtime, longer filter life, and the elimination of the expensive vacuum switches.

In 1976, Charles Gatto and A. J. Blackburn, both senior administrative specialists in Boston, split a \$75,000 award. They figured that the number of demonstration typewriters used by sales representatives could be reduced. The result: some 25,000 more typewriters

were made available for rental.

Birkner, Gatto, and Blackburn may not have realized it, but Dr. Campbell says they probably went through the same creative stages as someone solving a much less complex problem.

As he sees it: "Creative people learn the background of a situation. They become absorbed in it. They get away from it for a while. Then they get an idea and apply it to see if it works."

But no matter how thorough the process, not every idea submitted to IBM is the earth-shaker its creator thinks it is. Only about one in five is adopted. And because of the complex nature of the business, it may take as long as 60 days—sometimes longer—to evaluate.

"Since a suggestion is evaluated in the department it affects, it has to stand up to tough tests," says Don Gray, program manager, suggestions, in Armonk. "Many ideas are impractical. Some don't save money. Some don't apply to IBM. Some could cause a problem in another part of the business. That's why we ask employees

Michael Sekerak, a service planning representative in Sterling Forest, N.Y., improved index links on high-volume printers. He won \$10,710 and used it for the down payment on a new home.



Taldena Zacharias, a field engineering training specialist in Des Moines, earned \$8,000 for making it easier to file and assemble sets of training manuals. She helped her church buy property and put the rest into U.S. Savings Bonds.



to look at the *Ideas for Improvement* booklet first."

"I got turned down so many times that I almost decided to quit trying," says Eveline Hilman, an administration specialist at the Brooklyn plant. "Then one day I saw these women riveting by hand. I suggested the company buy a riveting machine. They gave me \$1,665."

Eugene Raudsepp of the Princeton idea firm believes putting two and two together, as Miss Hilman did, can happen to a lot more people than it does. "Everybody is born creative," he says. "If they feel they're not creative, it probably has more to do with their habits than anything else. People go around saying they wished they could come up with good ideas. But they really aren't ready to consider anything new. They like the easy, habitual way of doing things."

"When habits change, creativity happens. It's just a free and scaling imagination that says, 'the best of anything is yet to be done.'"

"That's why we have the program,"

Think

says Robert N. Beck, director of benefits and personnel services in Armonk.

"Every time we improve on something, we become more competitive. And in this business, that competitive edge goes a long way. We know there's always room for improvement."

It would appear that no one believes that more than an IBM Suggestion Award winner. "I'm working on an idea now," says Rentfro, "that might be worth the max—\$75,000. But even if it isn't," he purses his mouth, in deep thought, "I'm going to keep right on trying." □

Ten ways to light a bulb

- Find out why something is being done the way it is.
- Be open-minded. Don't make premature judgments. Abandon preconceived notions.
- Brainstorm. Let your imagination go. Don't reject ideas because they seem silly or ridiculous. A seemingly foolish thought can sometimes lead to a valid one.
- Be flexible. If one approach leads to a dead end, switch to another. Use as many viewpoints as possible.
- Be selective. Think to the point.
- Be persistent. Take a crack at the

problem each day. If you can't find a solution, forget the problem for a week. Then return to it.

- Listen to your co-workers' problems about the details of their jobs. You may be able to see a solution because you're not involved.
- Make notes. Little notions that could lead to solid ideas can be easily forgotten.
- Read about award-winning suggestions. Someone else's idea may trigger one of your own.
- Have fun. It isn't necessary to be serious to win.





Gingerbread and glass

Gracious and purposeful, Toronto, headquarters of IBM in Canada, is a city that works.

The first landmark a visitor sees when approaching Toronto from any direction is the Canadian National Tower, at 1,815 feet 5 inches, the world's tallest free-standing structure. The tower stands as a symbol of Toronto's growing eminence as the financial and commercial center of Canada.

It is a growth barely slowed by Canada's current tussle with the twin problems of inflation and unemployment—both now over 8 percent.

Toronto has head offices of more corporations worth over \$1-million than any other Canadian city—and leads all cities in North America in industrial growth. It is headquarters for three of Canada's five largest banks and ten of its major trust companies.

Last year, total shares traded on the Toronto Stock Exchange—rated second only to the New York Stock Exchange in North America—amounted to more than \$5-billion.

In the past 25 years, the population of Metropolitan Toronto (the city and five suburbs) has doubled. One-third of Canada's buying power resides within a 100-mile radius of the city.

A classic pattern of urban growth? Classic, except for one difference: The inner city not only has not decayed, its value as residential real estate has skyrocketed. Public transportation is smooth and efficient. The crime rate is one of the lowest in North America.

After the exodus to the suburbs that followed World War II, many Torontonians decided they preferred the advantages of urban life. Unlike people in virtually every major North American city, however, they found that they could go home again. Urban decay had not set in.

Why? The answer is complex. One factor is that Toronto's government

Text by Michael L. Lazare
Photographs by Tom White

Michael L. Lazare is a program administrator in management communications at Corporate Headquarters.

Who says a big city can't be livable?

chose to distribute subsidized housing for the elderly and the indigent throughout the Metro area. Instead of living in the midst of thousands of units, all depressingly alike, welfare recipients live in upper- and middle-class neighborhoods.

Another reason, says Doug MacPherson, an IBM data processing systems engineer, member of the Toronto Planning Commission, and resident of a downtown house, is a bill that was passed in 1972, forbidding new building permits for any building—residential or commercial—higher than 45 feet.

"What did real estate developers do? They quickly found the ideal answer," says MacPherson. "They refurbished old warehouses, row houses, and factories and made them into attractive homes, offices, and shops.

"Understand that antidevelopment is not unanimously liked. The Ontario Municipal Board is in the process of holding public hearings on the ban. Not only builders oppose it, but many citizens do, too. The future of Toronto hasn't yet been determined."

But MacPherson gestures toward Toronto's mixture of old and new—Victorian gingerbread side-by-side with glass skyscrapers—and adds: "Whatever the Board decides, the character of the city can't change too much. The redeveloped areas of boutiques and sidewalk cafes in Yorkville, the shops on Bloor Street, the residences all over the city are here to stay. Toronto is where I live and where I work. It's a good city."

Ron Clifford, DP vice president for the Central Region of IBM Canada, agrees. He gazes out of the east and south windows of his office on the fourth floor of the Royal Trust Tower in downtown Toronto and says: "What you see here is the financial and commercial heart of Canada." (Continued on page 30)



Mary Turnquist, a former Bostonian, has a major complaint about living in Toronto. "The nearest park for my 20-month-old daughter is three blocks away," she says. Then, remembering she's talking to someone from a U.S. megalopolis, she laughs and adds: "I suppose that's not such a big deal to you, but I've been spoiled by the livability of Toronto."

Mrs. Turnquist is a systems analyst who works in IBM Canada Headquarters. She and her husband, who is on the staff of the University of Toronto, live in a renovated townhouse in an area of the city known as "Cabbagetown." "I've lived here about seven years, and I love it. It's a family city. It's safe and has a lot of parks. It's a big city with all the facilities of a big city, with good public transportation, with great cultural events.

"Yet my husband and I can bike on weekends and go wherever we want."

Armed with a B.A. in secretarial sciences from the University of Western Ontario, Peggy Love (right) joined IBM seven years ago. "I worked as a secretary for four years in head office and then, having seen that IBM's strength lay in marketing, I decided to give it a try."

Where is she now? Working out of the Toronto OP office, selling Copiers. "It was a funny thing. I went in as a Copier MSR [Marketing Support Representative] determined to take the first opportunity I could to get into typewriter marketing. I was so impressed with IBM's Copier products and the excitement of the turbulent Copier marketplace that I decided to stay.

"My first year on quota was 1976. I made the Club that October. Last year I qualified in August.

"There are highs and lows in this business, but there's nothing in the world like the high of selling. I love working in this city. I work hard, and I believe in what I'm doing."

More often than not on summer evenings after work at IBM Canada Headquarters, Paul Sutherland takes his house out for a sail into Toronto Bay and Lake Ontario.

Home for the summer to Sutherland is a 27-foot boat moored about a mile away from the city. "I see the skyline from my boat," he says. "It's a beautiful city. I love it. I virtually live in the city, enjoy all its advantages, and yet I'm remote from it."

A senior film and TV producer in communications, Sutherland has spent the last three summers aboard his floating home.

"Toronto has everything—the theaters, the restaurants, the variety and the freedom. It's all there when I want it, yet I can still be alone when I have to be."



Jack Mackness, a methods analyst in distribution for GBG Canada, is part of a trend generally unknown in the U.S. He just moved back into the city, to a 66-year-old house just to the east of downtown.

"I'm presently remodeling the house myself, and enjoying it. I've lived in subdivisions and suburbs, but living in a house within the city limits is a new experience. I'm looking forward to it."

Mackness thinks Toronto is the way a city should be. "I don't believe you could find a single area in the city that's a real slum. What made Toronto grow and develop was the needs of the times. It was obvious that Toronto was a center, and people were attracted to it. Our city officials realized this and did the things necessary to attract people—keeping the streets clean, providing safe, efficient transportation, giving protection to the citizens."



(Continued from page 28)

"The economic slump hasn't affected us much. Banks and commercial concerns need data processing. They always will. It's the same story as in the States during the '74-'75 recession. Times were tough, but people found that data processing was not an item to be pruned from the budget. The same thing holds true here.

"IBM Canada is in a good position. We have competition, sure, notably Amdahl and Univac. We've taken our lumps. In fact, so many people want the 3033 that some have become impatient at not being able to take delivery as early as they'd like. We've lost a few customers, and that has hurt. But we're fighting back vigorously.

"Two out of five DP points installed in Canada are in the Central Region [which includes all of the Province of Ontario, Canada's most populous, except the city of Ottawa, Canada's capital]. And more than one out of every three points installed in the country is in Toronto. I see no end to the growth of this city—or of IBM in it."

Toronto's growth takes enormous amounts of money. And the city's banks are a prime mover.

There's one major difference between banking in Canada and in the United States: Canada has nationwide banks, six of them—stretching across four-and-a-half time zones—from Newfoundland to British Columbia.

One of the six is the Bank of Nova Scotia, which has the world's largest installed inventory of on-line IBM 3600 series banking terminals. "We couldn't be where we are today without our data processing equipment," says Erik Sorensen, the bank's director of systems development. "We went into the consumer business in a heavy way when Canadian banking laws were changed to allow banks into the consumer loan business. Then, when Chargex [BankAmericard/Visa] came along, we went into that in a big way,

too. We'd be lost without our data processing network.

"We need information. Things are happening in the banking field a lot sooner than in the past, a lot more rapidly. We've been concentrating on putting applications out in the field, where the customers are. Now we're looking at providing functional capability in the head office.

"How do we see the future? User interaction with the head office and with the central d.p. facilities. That's the key. No bank that spans 3,500 miles can exist without instant information."

Torontonians love flowers. During the summer, the city is a riot of red and white blooms everywhere—in parks, of course, but also in front of office buildings and residences, at the entrances to hotels, and on the mall that divides University Avenue.

In the wintertime, plastic coverings appear everywhere to protect roots and shoots from Toronto's fierce winters.

There's a particularly large proliferation of flowers—and plastic protection—on the architecturally eclectic campus of the University of Toronto. This is one of Canada's oldest and largest universities, founded in 1827 and now numbering over 44,000 students.

From the university have come many of Ontario's leaders in every field. And here it was that Frederick Banting, John J. R. Macleod, Charles H. Best, and J. B. Collip discovered insulin, an accomplishment that earned Banting and Macleod the 1923 Nobel Prize in physiology.

The tradition of research continues, in fields such as high-energy physics, molecular chemistry, engineering, the social sciences (Marshall McLuhan's home base is the university). Today's academic researchers have access to tools that would have made the discoverers of insulin envious—like a Sys-

tem/370 Model 165.

But not only learned professors use these machines; students at the university have come to rely on computers as part of their studies, no matter what their specialization.

"Talk about volume," says Rein Mikkor, acting director of the computing center. "We ran 1.6 million jobs on our academic computers in 1976-77. You see what that means: Everyone who requires access to the computer can have it. It has to be that way.

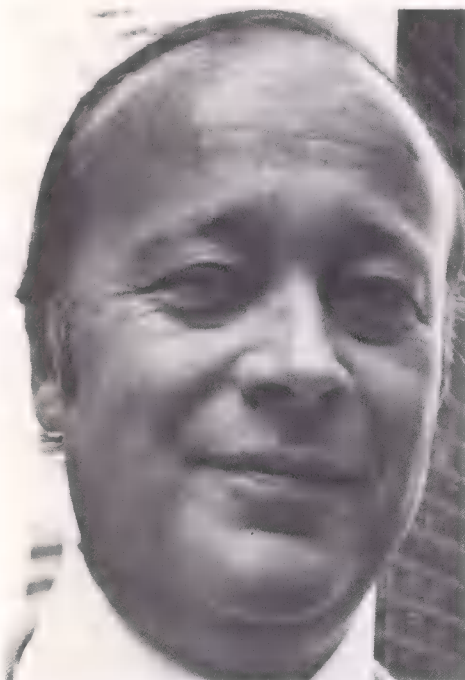
"We have one of the largest computing centers of any Canadian university, and there's a constant demand for more use. We couldn't run the university's administrative process without the computer, either. We have a Model 158 that we use as a major IMS [Information Management System] installation. Look, we have 31 colleges and faculties; we have a first-rate university. We have to have computing.

"The university is a very large organization, and it needs the computer for the same reason that large businesses do. We had a fire in the center last February. With the help of IBM, we were able to run some of our most important jobs immediately; we were back in full operation in eight days. The computing center is very much a part of the lifeblood of the university; we didn't realize just how much until we temporarily lost a part of it."

In the physics building of the university this past Christmastime, three students were hanging a large yellow banner, announcing a party, from a balcony overlooking the main entrance. It read: "Celebrate the holidays. Dispel all thoughts of exams. Comforting beverages will be served."

Throughout the city, the signs of Christmas were everywhere: Christmas trees, angels outlined in lights, the Salvation Army. On the rooftop track

On the Toronto scene: Ron Clifford, left, DP vice president for IBM Canada's Central Region; Doug MacPherson, right, DP systems engineer; Ron Barker, DP account manager, Bank of Nova Scotia.



Think

of a downtown building, a die-hard jogger doing his morning three miles in sub-freezing weather paid homage to the season with red shorts, a green sweatshirt—and small Santa Claus dolls affixed to his running shoes.

Everywhere—in downtown department stores, Bloor Street specialty shops, neighborhood shops, underground shopping centers—retailers seemed not to have heard of the declining economy as they struggled to serve the Christmas crowds.

About a mile east of the university is the headquarters of Simpsons-Sears Limited, Canada's largest retailer of general merchandise. The company is owned 41 percent by Simpsons Limited of Toronto, 41 percent by Sears, Roebuck of Chicago, and 18 percent by the Canadian public.

Simpsons-Sears has 62 retail stores throughout Canada. A large part of its business is also catalogue order, and the heart of this operation is in a striking inverted pyramid of brown brick on Jarvis Street.

Inside is what Lesley Turnbull, OP marketing rep on the account, calls "probably one of the most advanced word processing centers in Canada." The center helps produce the Merchandise Listing, which acts as an "internal catalogue" to retail stores, reflecting current merchandise information. Previously, preparation had been a tedious and time-consuming manual task. Through its IBM 6.5 dictation equipment, it also enables anyone in the company to dictate a letter by telephoning it in. The letter is quickly transcribed and routed to its destination.

Four subway stops from Ron Clifford's office stands the Ontario Parliament building, Victorian in its splendor. Situated in Queen's Park, the complex is

surrounded by handsome gardens and graced by statues of Canadian heroes. Presiding over the park is a statue of the Queen herself—Victoria.

It is here that legislators formulate the laws that govern Ontario's 8 million residents. But the day-to-day work of running the province is carried on by a professional corps of 60,000 public servants. A few blocks from Queen's Park, on Bloor Street, is the office of Leo Belanger, executive director of the Computer Services Division of the Ontario Ministry of Government Services.

Belanger oversees the work of 300 people who operate three data centers where two System/370 Model 168s (one with an attached processing unit) and a Model 158 are installed.

"We're unique in North America" says Belanger, "in that we supply computer and computer-related services to the Ontario government for a fee. We're self-supporting—and we're in competition with the private sector. If a service bureau can do it better and more cheaply, it gets the job. So in order to stay in business, we must continue to compete effectively."

Much of the need for computing is in Metropolitan Toronto. But there are terminals scattered all over the province, which is larger than any state in the U.S. except Alaska, stretching 1,000 miles from eastern New York to central Minnesota and 1,050 miles from the Great Lakes to Hudson Bay.

The government's computers are used for such vital services as health

insurance administration, registration of drivers and vehicles, the preparation of tax assessments for Ontario municipalities, calculations on revenue sharing, and the preparation and administering of provincial budgets. Says Belanger: "The way we see our development is twofold.

"First, in the next few years, the computer is going to be used increasingly as a productivity aid. Second, in the longer term, senior officials will have to have access to computing power—not just as a productivity tool, but as a management tool—to help them make valid decisions. We're headed in that direction. There's no doubt that the computer will become even more deeply embedded in the fabric of government than it is now."

On the streets below Belanger's office, rush hour is just beginning: private cars, taxis, a swarm of pedestrians headed for Toronto's buses, trolleys, and subway trains.

Traffic is heavy, but it moves. There are no double-parked trucks. The sidewalks are clogged with people, but there is no jostling, no pushing. A visitor asks for directions; a man carrying a briefcase says: "Come with me." He walks three blocks out of his way, shows the visitor his destination, and returns to his original route.

At the corner of Yonge and Bloor Streets, a child tosses a candy wrapper from a car. Without breaking stride, a gray-haired man in a derby, carrying a rolled-up umbrella, picks up the wrapper while crossing the street, carries it to the opposite sidewalk, and deposits it in a municipal waste receptacle. □

Sixty Canadian candles. And one to grow on

Toronto is headquarters for IBM Canada Limited, a wholly owned subsidiary of IBM World Trade Americas/Far East Corporation. The company has its origins in The Computing-Tabulating-Recording Co., from which IBM was formed. By 1918, its small head office and factory in Toronto employed about a hundred people. Today, there are 1,700 in the Toronto headquarters alone and 3,000 in five manufacturing plants and a research and development lab. The rest of the company's 10,600 people are located in 58 branch offices across Canada, 3 education centers, 13 datacenters, and an International Communications Systems Marketing Center in Montreal.

In 1976, exports valued at more than \$196 million were shipped by IBM Canada to 98 countries. The company is a

major contributor of corporate funds to, among others, universities and organizations doing medical research, the National Ballet of Canada, and the Stratford Shakespearean Festival.

In its manufacturing plants, located in Bromont, Toronto, and Montreal, IBM Canada manufactures typewriters, micro-electric circuit substrates, terminals, and printers, as well as punched cards and paper forms.

The Toronto development lab, formed in 1967, pioneered in the development of on-line banking systems. It has also done important work in key entry devices, offtrack betting terminals, small processors, and special computer networks.

Willowdale, just outside Toronto, is Canadian headquarters for another IBM subsidiary—Science Research Associates, Inc.

As a new law takes hold

IBM's copyrights get more protection. So do works of others.

Anyone afflicted with "copyitis"—the urge, the compulsion, the near-obsession to run anything through a copying machine with nary a second thought—may look back on 1977 with more than usual nostalgia.

For the start of 1978 is bound to be recalled as the time when Public Law 94-553, more widely known as the new Federal Copyright Law, went into effect. The new legislation is the first major overhaul in the field since William Howard Taft occupied the White House back in 1909.

Copyright, often referred to as the ownership right in the expression of an idea (patents relate to the use of the idea itself), has been around in the common law since the invention of the printing press in the 15th Century. As the name implies, *copyright* stands for the right to copy. And also the right to own and control the copy, or the author's work. It applies no less to an artist's or composer's stake in a creative work.

Just as Gutenberg's invention got it all started, more modern technology, such as the IBM Copier, has been the driving force behind the new legislation. Such new developments, although covered under intervening court decisions, could hardly have been envisaged in the 1909 law. Not only does the new law strengthen traditional copyright protection given to writers and artists, it also adapts copyright rules explicitly to such fields as radio, television, and photocopying.

The new legislation affects IBM's business in several ways. As a major user of professional journals, magazines, and other materials copyrighted by others, IBM must assure that royalties are paid when required. Under the old law, the courts clamped down on many copying abuses, including the pirating of complete works. But they had not clearly spelled out the permissible limits of photocopying. Under more stringent regulations, IBM, whose company libraries in the U.S. already subscribe to more than 2,000 different periodicals, will now pay substantially more for

copyrighted materials duplicated for use within the company.

However, as a major publisher of materials, such as SRA's instructional series, IBM may also derive considerably more protection of its copyrighted materials. Under the new law, this protection extends to information in machine-readable form—that is, on cards, tapes, or disks. So, protection clearly extends to the duplication of computer programs.

The new law also affects IBM as a manufacturer not only of copiers, but also of terminals and printers that can enter, display, or print out copyrighted materials. Since users of the company's products will have to have new ways of keeping track of the copyrighted materials they use, the new law may result in new development opportunities.

For most IBM people, especially those



of us susceptible to copyitis, the upshot of the new law will require us to "think" before running off umpteen copies of an article. Doing so, under the new law, can add up collectively to sizeable royalty payments each year by IBM, plus more in-house paperwork.

Don't worry, however, if you simply want a single copy of a newspaper or magazine article or a minor book chapter for individual study, scholarship, or research in connection with your job. For such "spontaneous" copying, the doctrine of "fair use" applies. It means that copying the particular article is not done at the copyright holder's disadvantage. In other words, that you would not run out and buy an extra copy of the publication if the copying machine were not handy.

What's "unfair," for example, is run-

ning off multiple copies for the whole department. Or copying several chapters of a book instead of buying it from the bookstore. Such volume copying might be expected to have a substantial impact on publishers and authors.

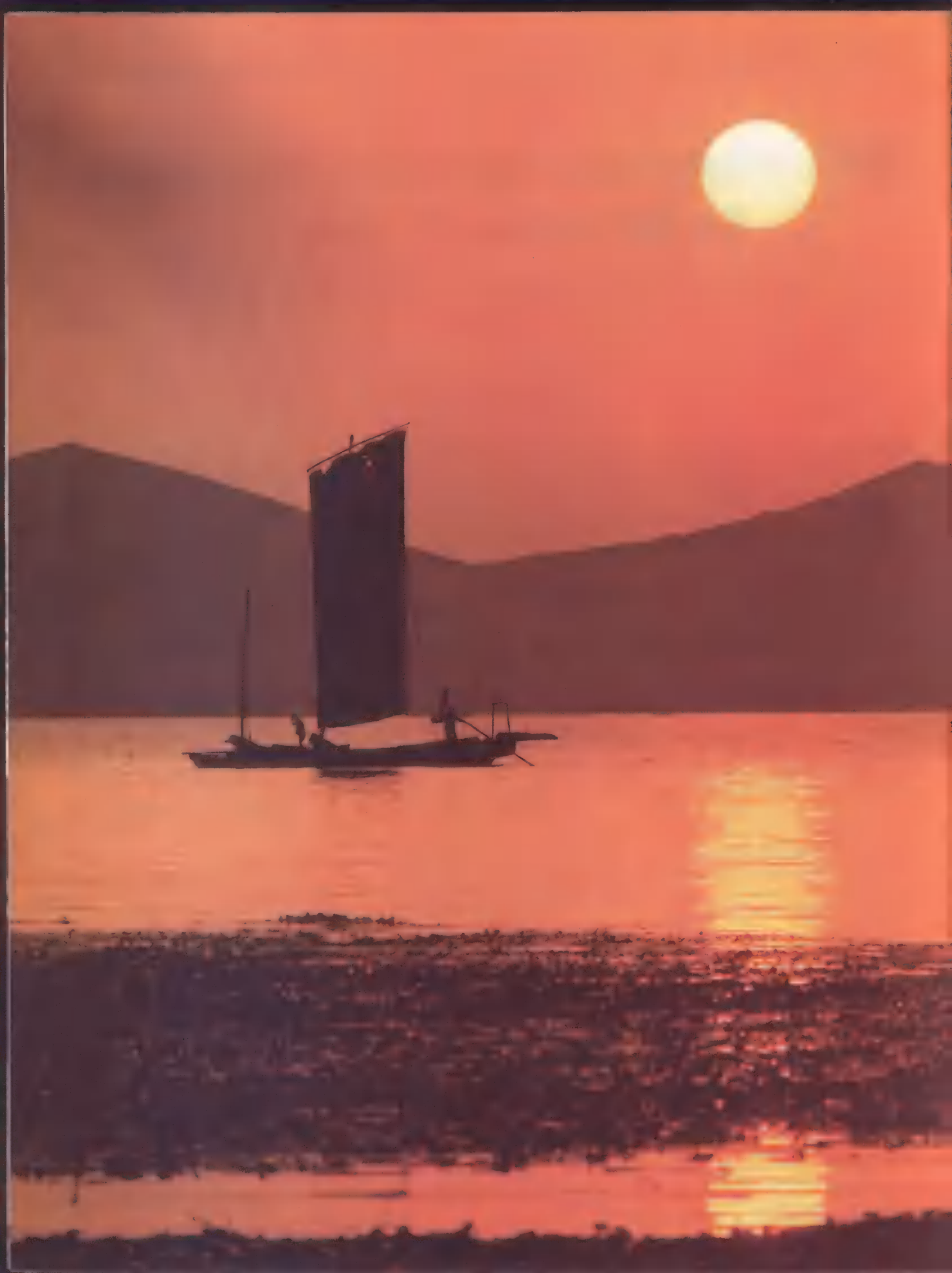
There are exceptions, of course. Making copies of promotional materials is usually okay. The more copies made of such materials, the better the publisher or sponsor likes it. If they don't have a copyright notice, it may also be all right to copy advertisements, even when they appear in a copyrighted publication.

If in doubt, it's best to phone your IBM librarian or patent attorney, at least until you become familiar with the law—especially since different publications often have different regulations. Remember, beyond fair use, it's always the copyright owner who finally decides just what can be copied, how many copies can be made, and what the charges will be. Under the new law, the absence of a copyright notice on a publication does not necessarily mean that an article is not protected, since the new law excuses such an absence for five years.

When multiple copies are justified and royalties are due, there's a simple procedure that will be adopted at most IBM locations. Just run off an extra copy of the first page of what you copy and write on it how many copies were made, your division code, and department number. Procedures may vary from one location to another. The marked copies will be collected by an assigned department and sent to the Copyright Clearance Center. The center is a non-profit corporation set up by publishers to calculate and collect royalties due and forward payments to the publishers. It's a handy system—copy now, pay later.

A sticky wicket? Perhaps. At least until you get used to it. But IBM has as much or more to gain from the new law through the greater protection of its own intellectual property. So do all of us, if we respect the efforts of other creative people.

—GEOFFREY D. AUSTRIAN



The East

Over the centuries, the Far East, with its heterogeneous cultures, histories, and international attitudes, has presented the rest of the world with intermittent mystery and surprise. It continues to do so. The non-Communist Far East nations, especially, are moving steadily into what *The Economist* calls "the age of capitalist miracles." Some—South Korea, Taiwan, Hong Kong, and Singapore—are moving into it faster than others.

According to a recent report from the U.S. Department of Commerce, the non-Communist nations in the Asian-Pacific area are rapidly becoming solid trading partners of the U.S. That trade

amounted to nearly \$55 billion in 1976, an increase of 22 percent over 1975. The area is now the third best marketplace for the U.S. (after the Western Hemisphere and Western Europe), importing \$23 billion worth of U.S. goods in 1976. And it has become the second largest exporter to the U.S., following the Western Hemisphere.

Japan, of course, is the highly industrialized pace-setter, but the efforts of the other Asian countries to build an export trade of finished products, as well as raw materials, are paying off, too. South Korea, for example, has just celebrated the attainment of its 1977 export goal of \$10

billion and has set a 1978 goal 30 percent higher. Its exports have been increasing annually at an average of 42 percent for the past 15 years.

No corporation has been more keenly aware of these promising developments than IBM's World Trade America/Far East (A/FE). The 17 countries in which IBM does business in that region of the globe form a long, narrow triangle of 6 million square miles. Its apex is New Zealand. One side of the triangle extends northwest through Australia to Afghanistan; the other, north by west to Japan. Even excluding Mainland China's population of between 800 to 900 million, A/FE's Far East geography

China Album



contains more than a billion people, 31 percent of the world's population.

Howard Figueroa, A/FE vice president, Far East, outlined for the combined meeting of the A/FE and IBM boards of directors in Tokyo last fall some of the difficulties of doing business in the Far East: 37 languages and hundreds of dialects, competition from U.S., European, and Japanese computer suppliers, inflation, dragging economies, and strong nationalism leading to a more rigid attitude toward international corporations. Yet IBM's business in the Far East is at a record level—orders in 1977 were more than 30 percent higher than in 1976.

The greater revenues are being obtained by fewer people, thanks to productivity, Figueroa pointed out. In 10 years, IBM's Far East revenues increased more than eight times, while employee population doubled.

One of A/FE's biggest needs in the Far East, says Ralph A. Pfeiffer, Jr., A/FE chairman and IBM senior vice president, is the continued development of nationals to operate IBM's business in their own countries.

"I believe that we now have a sound program for the development of our management potential—the countries are keenly aware of their responsibilities in this area," Pfeiffer says. "It's imperative that we have nationals with an understanding of the local culture, language, and social trends representing us. We've been growing so fast in the Far East that we're now engaged in a difficult assimilation process. Both our people and our customers' people have a great need for additional education in the application of computers to their national problems and goals."

At present, there is a significant emphasis at the Southeast Asia Region (SEAR)

headquarters in Hong Kong on promoting self-sufficiency among IBM's country organizations in the region—further acknowledgment of the dynamic progress and growth potential in Hong Kong, the Philippines, Indonesia, Malaysia, Taiwan, Thailand, South Korea, Singapore, and elsewhere.

The largest Asian country, the People's Republic of China, remains the dominant middle of the Far East.

Contact between Mainland China and the U.S. was restored in 1972 and, since then, the American Government has been urging U.S. industry to develop trade with the PRC. IBM, says Chairman Frank T. Gary, has long been interested in China's industrial development, its culture, its data processing status and requirements, and about just what can be done to help implement the U.S. government's policy of promoting trade with China.



The opportunity to find out came about in an unusual way.

When China's present foreign minister, Huang Hua, was his country's ambassador to the United Nations and stationed in New York City, he met Ralph Pfeiffer at a dinner party hosted by the Philippine ambassador to the U.N. Huang confessed his fondness for American football, which he watched on television. Pfeiffer took Huang to the first professional football game Huang had seen in person. He enjoyed it thoroughly, and the two men subsequently corresponded.

Last year, Pfeiffer informed Huang that he and other IBM executives would be in Tokyo in late October and were interested in visiting China. Huang extended the invitation, and Cary, Pfeiffer, IBM President John F. Opel, and Figueroa flew from Tokyo to Peking.

Their audience with Huang has been

reconstructed from rough notes taken by several members of the IBM party.

Huang offered little encouragement as to trade in volume between his country and the outside world in the near future. China's objective is self-sufficiency. He quoted the late Mao Tse-tung on the "four modernizations": China must achieve by the end of this century: agriculture, industry and commerce, defense, and science and technology.

Agricultural reform was nearly completed, Huang said. Even though the quality was not as good as elsewhere, he said, there was now enough—28 years after the formation of the People's Republic of China—to clothe and feed the people and to enable them to become masters of their own destiny. Disease, said Huang, had been reduced, controlled, or eliminated. China had rid herself of the label, "the sick man of the East."

(Facing top row, left to right): 1. Frank Cary and Ralph Pfeiffer in a commune general store near Peking; 2. Bicyclist traffic in Shanghai; 3. Primary school students learning English in Peking; 4. Students at a "middle school" in Canton; 5. Hitchhiking ride on a highway; 6. Howard Figueroa and John Opel on the Great Wall; 7. Privileged schoolgirl; 8. Canton good-bye.

China was once the world's most advanced country, Huang said, as he talked about its invention of the compass, paper, printing press, gunpowder, and its technological leadership in the 13th and 14th centuries. "Though determined to be self-reliant, we are now ready to import advanced science and technology from foreign countries so that we can develop faster."

The IBM executives next met with Li Ch'uang, deputy director of the China Council for Promotion of International Trade. Li Ch'uang had spent time in the U.S. in 1975 and hosts 200 business groups each year from industrially ad-
(Continued on page 45)

A search for sanity in antitrust

by Walter Guzzardi, Jr.

This article, which is excerpted from the January 30, 1978, issue of FORTUNE, covers the whole domain of antitrust enforcement and, as such, should be of interest to our readers. Reprinted by permission from FORTUNE Magazine©, 1978, Time, Inc. The illustration by Robert Grossman did not accompany the original article.

... The best scholars today agree that the intent of the Sherman Act was to protect competition recognized as the regime most likely to bring the benefits of efficiency to the consumer. But in the eighty-eight years since Benjamin Harrison signed the act, new statutes, amendments, and a flock of court decisions have buried that intent under a silt of contradictory purposes. Somewhere in the Disneyland of antitrust* can be found declarations and theories... that have nothing to do with competition, or that directly contravene its principles in the name of preserving a kind of Jeffersonian society of small, independent businessmen. Present for decades, the contradiction has made the antitrust laws, one might say, into an oligopoly of opposites—the one oligopoly the Carter Administration seems determined to perpetuate.

In seeking to do that, the Administration will be pulling against a quiet and little-noticed process of rethinking that has been going on in recent years and that seems to offer a way out of the depths of treacle in which antitrust is mired. Some influential academics who are also practicing lawyers are putting forth the radical proposition that the

laws should once again converge on their original purpose, the protection of competition for the benefit of consumers.

In part influenced by these arguments, and in part because of its own proclivities, the Supreme Court lately has been moving in just that direction. The leader of the new majority is Justice Lewis Powell, a frequent author of the Court's antitrust opinions. Besides Chief Justice Warren Burger, those often joining Powell are Potter Stewart, William Rehnquist, Harry Blackmun, and John Stevens—so that four members of the new majority are Nixon appointees. (Byron White is a vigorous dissenter, occasionally joined by Thurgood Marshall and William Brennan.)

Over the past few years, in a series of significant decisions, this majority has set about refocusing the laws on the principle of competition, while forswearing the social generalizing. If this reinterpretation of the theory and empirical methods of economics should permeate antitrust enforcement, many artificial barriers to efficiency could be removed. At the same time, abuses by business that restrain output and raise prices would be precluded.

Responsibility for the fact that antitrust lost its way over the years can be laid about equally on the steps of the Capitol and at the threshold of the nation's courthouses. Starting with the Sherman Act, Congress has traditionally passed antitrust statutes whose language is as sweeping as that of the U.S. Constitution. Extraordinary powers of interpretation have therefore been left to the courts, which have become the primary policymaking agency in the field, possessing, as a jurist once said, "an authority that they have in no other branch of enacted law."

In no other branch of the law, either,

have the courts wandered further from first principles. Moving away from the emphasis on free competition and efficiency that marked the early decisions against the old oil and tobacco trusts, judges have used the antitrust laws to express their own "stream of tendency"—the phrase is Justice Benjamin Cardozo's—about social values. Economic arguments have been used as disguises for, or subordinated to, the randomly expressed social yearnings of appellate and Supreme Court justices.

In the case that stands as a classic in the monopoly field, brought successfully by the government against Alcoa in 1945, the economic argument was drowned in romantic longings for another age. In his opinion, Learned Hand, a great judge except in antitrust matters, showed a good grasp of the merits of competition; but then he went on to daisy-pick in social fields. "Great industrial concentrations are inherently undesirable regardless of their economic consequences," he said, explaining neither what made them "inherently undesirable" nor on what authority, having discarded his economic mandate, he could strike them down. Hand believed we must "put an end to great aggregations of capital, because of the helplessness of the individual before them." Antitrust's objective, he concluded, "was to protect and preserve small units"—even if that meant higher prices.

After thirty-three years, Hand's Alcoa opinion stands as a much cited and celebrated precedent. But the opinion was so soaked with unexamined social concerns that it did not really get to the core of the economic issues. Alcoa had achieved its monopoly not illegally, but by correctly anticipating the great coming demand for aluminum, and building capacity to meet it. As a result, Alcoa ended up with 90 percent of the

* Antitrust statutes include the Sherman Act, the Federal Trade Commission Act, the Clayton Act, the Webb-Pomerene Act, the Robinson-Patman Act, the Miller-Tydings Act, the Celler-Kefauver Act, the McGuire Act, and the Hart-Scott-Rodino Act. A leading antitrust expert, Richard Posner of the University of Chicago, has argued cogently that Section 1 of the Sherman Act, which prohibits "every combination, contract or conspiracy... in restraint of trade," is all that is needed to protect the freedom to compete.



A search for sanity in antitrust

virgin ingot market. Tough questions such as whether so dominant a position, even though legally attained, is against the law, or whether the definition of markets should also include foreign imports and competitive materials, were never adequately analyzed or settled. Some of these points are said to have been raised with the jurist after he handed down the decision; according to the story, Hand simply shook his head and muttered, "Too big, too big."

In the area of mergers, too, the judicial fondness for a better social order has diminished or displaced the rigors of economic analysis. Extensive work done by Yale Brozen at the University of Chicago and Harold Demsetz at U.C.L.A. suggests that in many industries, such as locomotives or automobiles, increased concentration brings about economies of scale and lower prices. An industry may be more competitive with ten members than with twenty. In any given industry, the specifics need study.

But the loose language of the Clayton Act and the Robinson-Patman Act, those ill-advised overlays to the Sherman Act passed in times of intense anti-big business climates, extended to grateful courts and regulatory bodies a welcome opportunity to sidestep this kind of hard work. These statutes unwisely thrust antitrust authorities into the embryonic stages of industrial change. Concepts that have no real economic meaning and are remote from actual changes in the marketplace—"incipient" trends toward concentration, "potential" threats to or "substantial" lessening of competition, and so on—became grounds for legal and administrative antitrust intervention.

Especially during the era of the Warren Court, the underlying assumption that courts or regulators could discern and stop anti-competitive activity before it began was used to throw out mergers by the bushel basket. The

Court's opinions, to be sure, are furnished with some "de rigueur" economic decor. In reality, though, the justices departed from the boundaries of economics to travel the broader pastures of social policy. In the end, competition was defined as a matter of mere arithmetic: the more companies in a given industry, the more competitive the Court held it to be.

Economic analysis has been just as sadly lacking in court decisions that have forbidden a profusion of business practices other than mergers. The opinions have rested on tendentious labels derived from the Clayton and Robinson-Patman acts—barriers to entry, exclusionary practices, discriminatory pricing, predatory pricing—that prejudge the issues. The only way to determine whether such practices violate antitrust is to examine each case to determine, for example, whether barriers are natural or artificial, exclusionary practices fair or unfair, price-cutting below cost or not. There are no absolutes.

But absolutes remain the favorite mode of reference in antitrust. The Robinson-Patman Act, which just about every antitrust authority thinks ought to be repealed, prohibits "price discrimination" and "predatory pricing."

But as it has been interpreted, the Robinson-Patman Act does not allow cost differences to be reflected in prices. The absurd consequence has been to make downward price flexibility illegal. In one instance, a wholesaler was forbidden to sell at lower prices to jobbers who did their own warehousing, even though when that happened, costs to the wholesaler were substantially reduced.

Again, the landmark decision came from the Warren Court. The Utah Pie Co., a local firm, had 67 percent of the

frozen-pie market around Salt Lake City. Continental Baking entered the region and sold its pies at prices lower than Utah's. During the price war, Utah Pie continued to increase its sales and profits although its share of the enlarged market fell to 45 percent. No evidence proved that Continental was pricing below costs. But Utah Pie sued, alleging predatory pricing, and won.

To Donald Turner, a former chief of the Antitrust Division and now a professor at Harvard, and Phillip Areeda, a noted antitrust expert and a colleague of Turner's at Harvard, the "substantial problem" in the case was the very one that the Court did not address—the calculus of costs. Turner and Areeda point out that predatory pricing has a precise economic definition: it means pricing below marginal cost by a company willing and able to sustain losses for a prolonged period in order to drive out weaker competitors. Calculating marginal costs is complicated, but to determine whether predatory pricing has taken place, the difficult analysis is unavoidable. Concludes Turner: "To define predatory pricing without reference to economic analysis makes no sense at all."

One has to assume that during the sixteen years of the Warren Court, government lawyers reached levels of brilliance never approached before or since. In that period the Justice Department and Federal Trade Commission won all but one of the eighty or so antitrust cases argued on their substantive merits before the Supreme Court. The string of victories would probably have been longer still had not corporations ceased appealing lower-court decisions. Most of the cases that the government won were merger cases based on the theory of potential competition.

In one of its first antitrust cases, the Burger Court said goodbye to all that. Showing its willingness to look at business realities, it came to the shocking conclusion that even when the government's arguments rested on the usually surefire potential-competitor theory, the government could be wrong. The proposed merger was between the National Bank of Commerce and the Washington Trust Bank, both located in the state of Washington. The National Bank was the second largest in the state, but it had no offices in Spokane, where Washington Trust had its seven branches. The Antitrust Division contended that the pro-competitive effect of having the National Bank on the edge of the Spokane market, but not in it, would be lost if the merger were allowed.

(The government seems to prefer having companies forever in the wings, but never stepping out onto the competitive stage.) It also argued that the merger would encourage an incipient trend toward concentration in Washington banking.

Writing for the new majority, Justice Powell narrowed down the central issue to whether or not competition around Spokane would be inhibited if the merger were allowed. Looking at the Spokane market, Powell and others in the new majority found no damaging level of concentration. Turning down a chance to display its prescience, the Court also decided that should such concentration appear, there would be time enough to deal with it then.

In another bank case, the Burger Court permitted Citizens & Southern in Atlanta to acquire a group of small suburban banks. The Court decided that, as a result of the acquisitions, customers would have more services to choose from, and so new kinds of competition would be extended to those areas.

The many and complex arrangements between manufacturer and retailer have always troubled the enforcers of antitrust. Retail price-fixing by manufacturers is illegal *per se*. Territorial restraints imposed on retailers are highly suspect, even though not very much judicial or judicious study has been given to the various motives involved, or to the effect on retail prices. In a decision handed down last summer, however, the Burger Court, again with Powell writing the opinion, took a hard look at the evidence being supplied by the market itself.

After G.T.E. Sylvania's share of the market for television sets dropped to a minuscule 1 percent, the company decided to tighten up its distribution system. It began to sell its sets exclusively to a small group of franchised retailers, and it permitted those retailers to sell only in specified geographic areas. The strategy apparently worked; the company's share of the market soon climbed to 5 percent. Then the holder of one franchise began to sell Sylvania sets in an unauthorized location; when Sylvania revoked the franchise, the retailer alleged a conspiracy to restrain trade.

Refreshingly, the Burger Court noted that "vertical restriction" is a complex concept, and that some vertical arrangements might improve competition while others might hinder it. In this case

Sylvania's increase in market share demonstrated that it had chosen aggressive dealers who competed successfully with more popular brands—intensifying competition where it really mattered, at the retail level. In ruling for Sylvania, the Court explicitly reversed a holding in a previous case by the Warren Court.

With that reversal, criticism of the Burger Court began to spread on Capitol Hill, and now it has reached the point of confrontation. About a year and a half ago, Congress passed a complicated statute, the Hart-Scott-Rodino Act. The act gave the state attorneys general the right to sue antitrust violators on behalf of consumers who as a result of the violation paid higher prices, but in amounts too small to justify individual lawsuits. The legal doctrine involved, known as "*parens patriae*" (the state as parent), in effect permitted class-action suits when the state attorney general serves as lawyer for the injured class in antitrust suits.

The Burger Court was injected into the "*parens patriae*" matter when it heard a case brought by the state of Illinois and a group of local governments against the Illinois Brick Co., a manufacturer of concrete block, which had been found guilty of price-fixing. The issue that brought the case to the Supreme Court concerned the proper method for assignment of damages. Those bringing suit had bought the price-fixed concrete block not directly from Illinois Brick but from intervening contractors. They contended that they had paid added charges of around \$3 million as a result of Illinois Brick's price-fixing, and, as is common in civil antitrust suits, they claimed treble damages.

Upholding some famous precedents, the Burger Court decided that only direct purchasers are entitled to damages from price-fixers. The Court repeated the fears of its predecessors that otherwise there would be enormous difficulties in tracking cost and price decisions along the long chain of distribution, and in fixing the precise dollar amount by which the ultimate consumer had been hurt by the original sinner. To illustrate the difficulties, Milton Handler, a strong supporter of the Illinois Brick decision, asks how a buyer of a \$30,000 house could prove that he would have paid \$29,990 had it not been for a price-fixed tub in his bathroom. Besides, the Court feared "massive multi-party litigation" that might "create a serious risk of multiple liability" for the same offense.

That opinion infuriated the two subcommittees that oversee antitrust.

In pressing for legislation to override the Illinois Brick decision, the subcommittees have the support of the Carter Administration. John Shenefield [Assistant Attorney General in charge of antitrust] stresses the importance of civil suits as a means of enforcing antitrust law. He believes that the Court should be reversed to ensure that "some plaintiff will be available to challenge a violation."

Whether Shenefield is right or wrong on that specific issue, for Congress to overturn the Supreme Court's ruling in the Illinois Brick case would be unfortunate in a larger way. The Court's trend toward pragmatic analysis, and away from what Milton Handler calls "*per se*itis," is something new in the antitrust universe and ought to be encouraged. That of course is no reason to throw a halo around every Supreme Court decision. But no Supreme Court likes to be reversed by Congress, and if Congress overrides Illinois Brick, it may lead the Court to abandon its recent attempt to infuse some economic pragmatism into the antitrust laws and so may damage the emerging, practical pattern. Even granting Shenefield's argument, that might hurt the consumer more in the long run than allowing Illinois Brick to stand.

The direction in which the American economy has moved in recent years gives new urgency to the idea of re-dedicating antitrust to competitive principles, and provides a strong argument for dismissing the historic use of antitrust as a shield for small business. Small businesses have their advantages, their talents, and their secure place in this many-sided economy, especially in the service sector; they are not about to be crushed. To apply antitrust laws in their interest, which was never very sensible, distracts us now from what in an inflationary age must become the crucial reason for having and applying antitrust laws: to keep down prices in the marketplace. No matter what the economic phenomenon—whether "shared monopoly" or oligopoly or such complicated corporate practices as vertical distribution—the best way to judge it is by its effect on prices. That standard would serve as the best guide for the policymakers in the Carter Administration—if they can forgo the popular but futile gesture of bringing "a big case." □

“46”

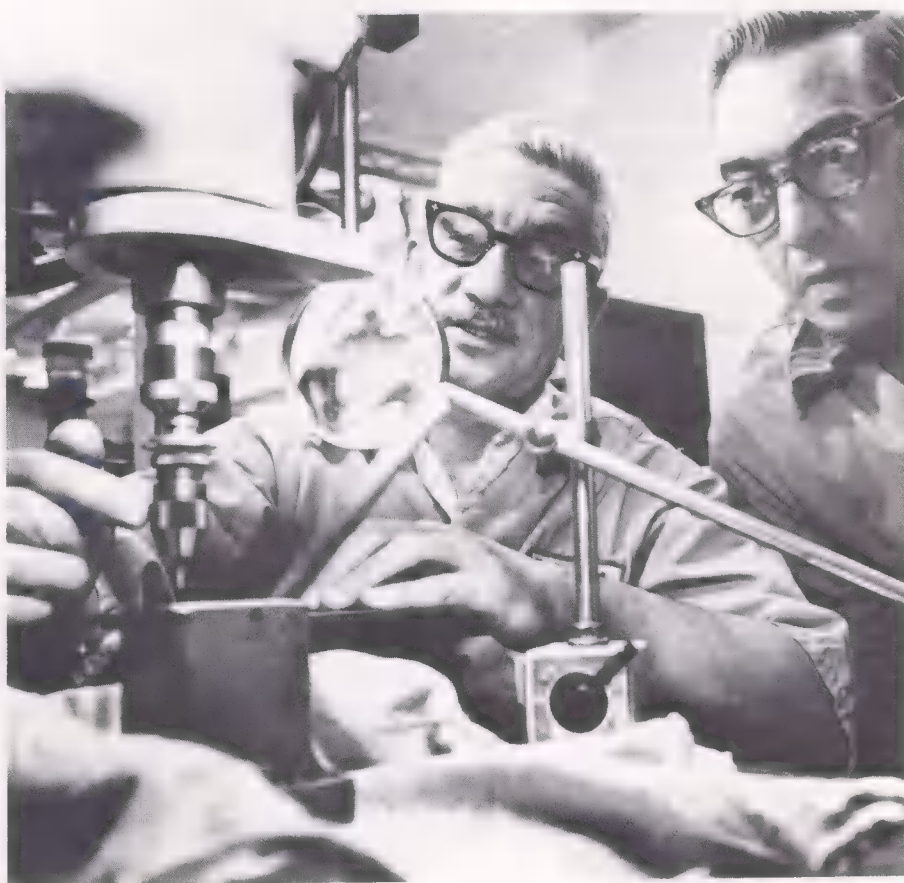
OLD

In the days before data processing was performed by silent, flickering electronics, before printers quietly jetted ink onto paper and assembly lines were automated, machining was the pride of IBM's historic Endicott plant. It still is. A keystone department was generally considered to be 460, the “model” shop known colloquially as “46.” It occupied an entire floor and employed 150 tool and model makers, deployed throughout a forest of milling machines, jig borers, and grinders.

The job of “46” was to keep the production line going. If trouble developed with an assembly line machine or if a part broke, there was neither the time nor need to send for outside help or parts. Fortunately, “46” could fix anything. No new product was introduced into manufacturing until “46” had built models of the tools needed to make it. Manufacturing engineering designed production “hard tooling” around the “soft-tool” models hand-fashioned by the masters of precision in “46.” Many alumni of “46” went on to positions of prominence at Endicott and elsewhere.

Long after computer manufacture began, most of IBM's installed equipment continued to be unit record machines, with mechanical parts pushing punched cards to other mechanical parts. Inevitably, “46” was needed to make parts no longer in standard production.

Once a solid corps of veteran craftsmen—an estimated 80 percent were always members of the Quarter Century Club—the department thinned out when the start-up of the Owego plant in 1957 siphoned off a number of them. Then, the two special retirement opportunity plans of the early Seventies, when work load went slack, reduced “46”



Many years have gone down the pike, but at Endicott they still turn to the tool and model makers of Department ‘46’ to keep the assembly line going.

Photo: Howard Thurston, left, tool and model maker in Endicott “46,” works on a rush project with Francis Canfield, precision boring machine operator.

to its present size. Today, "46" still operates around the clock, but the three shifts are manned by fewer people. Younger faces are now behind the lathes, borers, millers, grinders, and wire burners.

But the department's two day-shift managers, Norman Stewart and Richard Dilmore, say there will always be a need for expert tool and model makers in IBM, no matter what new technology comes along, and that "46" remains the mother lode of such skills.

The work in "46," Stewart says, is as diversified and challenging as ever, and for a number of reasons.

Endicott manufacturing needs many "46" tool models before it can scale up for production. Department members are sometimes on the road helping vendors meet IBM parts specifications. Much of the older electromechanical equipment is still being used by customers who insist they will never give it up, and "46" expertise is often needed to keep the unit record machines running. "Forty-six" stands high with both development and manufacturing engineering at Endicott.

Like so many Endicott employees, Stewart was born and brought up in an area where it was routine to apply to IBM for a job after high school. (His brother also works at the plant.) He began in 1946 on riveting hammers, worked his way up to an assistant office manager in the education center, and then applied as an apprentice to Department 460. He passed the aptitude test, the mechanical training course, and began working nights in 1954. (Day-shift spots went to the senior members.)

Stewart has seen a lot of change, with something different coming through the door every day. He doesn't feel threatened by technological change. For one thing, tools are needed to make the mechanical functions that electronics must have. For another, he knows the company does its best not to let

change make any of its employees' skills obsolete.

His big challenge is usually that of meeting tough productivity measurements. It isn't always easy.

The cardinal mission of "46" is to keep the assembly line from shutting down, Stewart says. What if an order of parts is lost? Parts must be handmade to keep the line going. What if vendor parts fail inspection? As many as five people from "46" may have to rework the parts in a hurry. What about the two antique card sorters that Social Security in Washington won't give up? The machines' blueprints, if they exist, says Stewart, must be in dead storage in Iron Mountain. It may seem expensive to hand-make parts for them; but when a machine is not properly functioning in a customer's office, IBM may not be getting money from it, he says, or IBM's reputation for service may pick up a tarnish spot. How can avoiding that be measured as cost?

Today, Endicott's advanced technologies and manufacturing processes are something few, if anybody, could have envisaged only a short while ago. Stewart reflects on that whenever he sees the SLT (Solid Logic Technology) card assembly line in one of the newer buildings. One man operates the computerized conveyor line that automatically dips the circuit boards in plating. Two repair technicians and a programmer keep it running. The more automated manufacturing becomes, the more Endicott's manufacturing costs are lowered.

The model shop, "46," is doing its part in contributing to that productivity, Stewart says. Some of the Bridgeport milling machines are over 30 years old, but "46" keeps them operating effectively. When blueprints began coming through in metric, "46" dual-dialed its machines to work in either measurement, but all the unit record equipment is forever frozen in decimals,

so "46" remains flexible. The electrical discharge wire burner machines, which can wear away metal to tolerances of 1/10,000 of an inch without touching it, have been equipped to operate by themselves, signaling any breakdown, and "46," through such homegrown ingenuity, has reduced 10 hours of production to 8.

The department has just ordered a new Bridgeport miller that is numerically controlled and can be dialed to whatever task is needed. The expectation is that this will also improve hourly production.

Nothing pleases Stewart more than to "have a tough order run on '46.'" Solving the unexpected tooling or parts problem is an art form the company is still proud of, Stewart says, and he can't think of a better or more creative place to be than in "46."

One of the veteran model tool makers in "46" is Howard Thurston. Stewart considers Thurston one of his most flexible men. Give him a hunk of metal and a rough design and Thurston will not only make the part, he is apt to improve on the design or suggest a new function for it.

A problem recently developed with the spica print wheel that Endicott produces. The wheel was chewing up the mylar tape, and "the order was run on '46'" to find and fix the problem.

The job was turned over to Thurston, who soon found burrs on the 100 type slugs that are on every spica type wheel. To eliminate them by hand would be impossibly difficult and slow. Thurston sat down with manufacturing engineer Harold Hutchinson and together they designed a machine that rotated a nylon brush against the rotating spica wheel, buffing off the burrs and "softening" the leading edge of the characters. Two of the machines were built and are now part of Endicott's

printer production line, turning out 200 burr-free print wheels a day and keeping the spica print wheel assembly line going.

Thurston is called a "boomer" by his associates. He came into the department 23 years ago and took to machines as if predestined for them. His hand-fashioned products suggest Thurston's similarity to an artist with the natural knack for painting without formal training.

Thurston's world—his work, his family life, his recreation—is pegged to the Susquehanna River Valley and an area little larger than 25 miles in radius. His modest home in Kirkwood, N.Y., a few miles downriver from Binghamton, is a few yards from the river and a mile down the road from where he was born 55 years ago.

As far as he knows, the families of both his parents for generations have lived in that part of the Valley. He remembers his mother's father, an undertaker in Binghamton, driving a horse-drawn hearse.

In 1941, when he was a senior in high school, someone from IBM Endicott came by the school and invited the students to take a mechanical aptitude test. Thurston passed it and attended IBM-sponsored after-school training in machining at a Binghamton high school. IBM was becoming what people in the region considered a family business, as the Endicott-Johnson Shoe Company had been in its day. Thurston's father retired from IBM 18 years ago; his brother is a 25-year veteran with the company plant in Poughkeepsie; and his sister worked for IBM in Endicott and New York City. Thurston joined the company in 1942 as a bench lathe operator, working on unit record equipment. After three years with the military—the only prolonged period in which he has been away from the Binghamton area—he returned as a finish grinder. His skills enabled him to skip apprenticeship and join "46" as a grinder.

Thurston feels lucky that something he had a knack for is in high demand at IBM, and he insists he has a better job than someone with a high school education would ordinarily have today. He carools the 18 miles to the plant with four other IBM employees who live near him, and though he finally attained the seniority entitling him to day shift, he misses one thing about the 11 years in which he was on second shift: It enabled him to hunt and fish during the day.

An outdoorsman at heart, Thurston was pleased that his son, whom he had taught to fish, and to shoot, skin, and dress game, started an auto body shop with another man in order to work out of doors as much as possible.

One day in December, when the thin "anchor" ice—ice that catches on the riverbank and traps other ice—was forming on the Susquehanna, he walked downstream where, in the horse-and-buggy days, people forded the river at Kirkwood. As he suspected, geese had settled on the river, and Thurston "kicked them off" (startled them into flight) and bagged one with his shotgun. He put the goose into his freezer for Christmas dinner.

In the hills above his house, deer abound. In heavy snow, they tend to herd, strip the trees of "browse" (small buds), and then, if mired in snow, starve. The state permits one deer per licensed hunter, and the season is one of Thurston's favorites. He drives his car a mile up into the hills and tramps the fields and woods in boots, a bright orange-colored insulated vest, and checkered jacket, trousers, and cap.

He likes the grandeur of the vistas that often catch him by surprise as he emerges from a grove of trees or crests a hill overlooking the Susquehanna Valley. Often he carries a bow and arrow or a special Italian muzzle-loader that he must patiently load with black powder, ball, and ramrod. It means

only one shot at a deer, which seems to Thurston fairer than the automatic shotguns that permit half a dozen shots in seconds.

Thurston and his son eat what they kill. In a rare season in which they both bag a deer, they dress one in the barn of a farmer friend with eight children and give it to him.

To Thurston, the Binghamton-Kirkwood-Endicott area is the land of milk and honey. His wife, Betty, cheerfully prepares rabbit, squirrel (a sweet-tasting meat, Thurston says, and highly underrated), and duck. He traps muskrats because they despoil ponds, and sells their pelts to a furrier in nearby Pennsylvania.

He and his wife are wilderness buffs, faithfully watching the Disney television shows on wildlife, as well as *Grizzly Adams*.

Several weeks ago, Thurston became eligible for early retirement, and the option places him in a quandary. He stands at his bench in the west end of the plant building he has worked in for 36 years and occasionally glimpses a V formation of Canadian geese momentarily stitched across the window near him. At that moment he decides to have a talk with his manager and find out just what he'll get with early retirement. He knows he could swing it. He'd like to go camping and have more time to fish and hunt and tramp the hills above the Valley. What better place could he retire to than where he now lives?

Then, he says, there's an emergency call from engineering to make a part they need to keep a production line going. And that reminds him again that there is something very satisfying and special to being in Endicott "46." Maybe retirement can wait. □

(Continued from page 37)

vanced nations. No American corporation has yet held a trade exhibition in China, he said, and he re-emphasized Huang's contention that self-reliance did not mean self-seclusion.

Historically, said Li Ch'uang, exporting was thought to be selling China's precious natural resources, and importing was called worshipping foreign things. That attitude is changing, Li Ch'uang said. China needed to learn from foreign experience and to import according to her needs.

China's modernization would take place, said Li Ch'uang, because of his country's rich natural resources; its more than 800 million industrious people; and its 28 years of experience under its current system.

The difficulties, he said, were China's poor industrial base, the three years of famine (1960-63), and the enmity of the Soviet Union, which withdrew its assistance, plans, and half-finished plants from China, prevented oil from entering China, and pushed China for repayment of its Korean War debts.

Later, Pfeiffer and Figueroa conferred with Mme. Liu, deputy director, China National Machinery Import and Export Company, who was responsible for computer imports. She told them she found negotiations with foreign companies complex and tedious. Contract discussions seemed endless and consumed much of her time. There has to be a clear understanding, she added, about what the U.S. is willing to export to China.*

Mme. Liu felt China's primary need in data processing is in high-technology information systems and not in office mechanization.

The 12-day trip took the executives from Peking to Shanghai, Hangchow, and Canton and, finally, to Hong Kong.

The overriding impression of all four was the friendly reception given them by the Chinese people wherever they went. In addition to their calls on government agencies, they visited communes, schools, and factories.

"We were allowed to go practically any place we asked to go," Opel says. "The well-being of the people could hardly have been staged for our benefit. One sure way you can tell if a people are content with their lot is the children. The Chinese children were happy and beautiful."

"It was very clear that the Chinese as individuals wanted us to like China," Pfeiffer says. "Crowds followed us down the street to see our reactions to what we saw in the shop windows, for example. When I shopped for a Chinese cap, I had to try on a half dozen before I found my size. When I did, the crowd broke into wild applause, and an elderly man held his thumb up in a victory gesture. Many of them must remember the old friendship the U.S. once had with China."

Will China ever become a major customer of IBM? As Cary has said on many occasions, in any country, such as the Soviet Union or China, where free enterprise is forbidden, it is simply impossible to establish branch offices and seek out business in the traditional way. The limitations imposed by state-controlled economies, Cary says, will always prevent the attainment of volume business possible within systems of full and open commerce. "As things now stand," says Cary, "we see no business bonanza in any Communist country."

At present, the only IBM equipment installed in China is a 3741 data entry station, seven punched card machines, and three dictating units. IBM, however, is having business discussions with the Chinese in several situations.

Should any of these activities result in a sale, how would IBM support instal-

lations inside China without the company's traditional network of sales and service?

"The customer would need extensive education in systems and customer engineering," Pfeiffer says, "and in programming. We would, of course, provide that education, and our people in Hong Kong would be on call to go in and support them as required."

While in China, the group also visited The Computer Institute, associated with Peking University, where they saw China's most advanced computer system. They also visited a Shanghai factory that produces small-scale computers and calculators.

"China is at least 15 years behind the industry in software development," Pfeiffer says. "As for their hardware development, it's very difficult to generalize, but it's fair to say that it's uneven. While they showed us a processor with semiconductor logic capable of one million instructions per second in their research lab, and small computers in production, they reported no activity whatsoever in the broad field of telecommunications. But then, China hasn't really concentrated on computer development, though they may be starting to. On a first-things-first basis, food, shelter, education, and medical care have consumed their attention and resources."

In retrospect, the IBM visitors to China generally agree that her rising domestic demands will continue to limit her exports. Furthermore, because China is reluctant to accept Western financing, she will probably continue to lack the means of becoming a major importer.

Some China watchers say things could change overnight. China's apprehensions over her international situation, or simply an envy of her growing, prosperous neighbors in the Far East, could draw her into a larger role as an importer of technology. □

* Licenses for exporting high technology to China would be granted American computer manufacturers only with the approval of the U.S. Government and its allies.

Wow! What a Year

(Continued from page 7)

administrative people, or working in a warehouse—have terminals literally at their fingertips to tap into information stored in a centralized data base.

The strong performance on the commercial side of the business has also been taking place in the Federal Systems Division. While FSD is part of the marketing group, McKay explains, "it operates separately. During 1977, the division set new records in sales, revenues, and profits. By every indicator, it hit all-time highs. FSD is a group of highly talented people who continue to supply special data processing solutions to complex engineering problems in the Federal marketplace. And their outlook for 1978 is excellent."

Manpower is another area that saw a dramatic turnaround during 1977. Since the dilatory years of the recession, when IBM was reducing resources, new marketing and systems engineering people, for example, have doubled—from 500 in 1976 to more than 1,000 last year. In 1975, the Field Engineering Division hired 18 customer engineers. In 1976, that figure rose to 185, and last year it jumped to 1,200. This year, it is expected to climb even higher. "That's encouraging to everyone," says McKay, "because the customer engineer, for example, can see help coming as he watches the workload go up."

The marked increases in demand for IBM products reached a point in 1977 where not only were new resources being brought in, but a new plant was begun in Tucson, Ariz., the first in the DP complex since the Manassas plant in 1969. "And that," says McKay, "indicates some turnaround."

While the Data Processing Marketing Group numbers its accounts in the thousands, the General Business Group, headed by George B. Beitzel, numbers its accounts in the hundreds of thousands. "And just like the rest of the

business," he says, "we've had a great year and set new records in business volumes and revenues."

Among the reasons why business has been good, he says, "is that we have several products that have been very well received by our customers. In GSD, the System/34 achieved the best new systems sales record ever, the Series/1 got off to an excellent start, and the 5100 has been setting records with orders up 50 percent over 1976. New installations of the highly successful System/32 and the larger models of the System/3 family continued at an outstanding rate.

"OPD's Office System 6, introduced last February, also exceeded our expectations. Both divisions have a wide range of products that offer excellent function and price for a broad customer base. And our customers responded by ordering record amounts of equipment last year. Installations have kept pace. And backlogs have remained strong."

GBG's ambitious hiring program and the addition of the General Technology Division have put its population over the 100,000 mark for the first time—better than one-third of all employees in the company.

Office Products, the Group's largest division in terms of people, is nearly twice as big today as it was in 1971. More importantly, its U.S. revenues have grown even faster over that period. An impressive year for office products and systems announcements, 1977 was also the first year for major installations of the Series III Copier and Office System 6.

The General Systems Division is another GBG operation that can boast a record year for 1977. It made quota for 22 consecutive months and has increased total net systems orders nearly two-and-a-half times over 1976. As Beitzel says: "GSD is leading IBM into low-end distributed systems, a part of the marketplace where it didn't have

much presence until a year or so ago."

Why the vigorous growth for the General Business Group? Is it because of the general well-being of the economy—the comeback from the recession years—and the vitality of the marketplace itself?

In a way, yes, Beitzel says. "But it's not quite the same as it is in the Data Processing complex. Since GBG focuses essentially on the lower end of the computer business and on Office Products and Office Systems equipment, we have tremendous potential in the broad customer base of first-time users. In fact, last year we added more than 130,000 new customers worldwide. As we come out with more products and add more resources, this potential will provide us with further avenues for profit and growth."

To the string of GBG successes, he adds the Information Records Division's achievements for 1977, one of the best years in its history. And that is remarkable, Beitzel says, because of the rapid changes IRD has encountered in the marketplace. In response, the division itself has changed rapidly—marketing diskettes, the flexible magnetic storage devices that followed punched cards, and also by going into the medical products area with its blood cell processing equipment.

"Another big piece of news for us last year," says Beitzel, "was the formation of the General Technology Division. GTD has already assumed a major strategic role in GBG by aligning its plans for technology with the product requirements of the General Systems and Office Products Divisions. At the same time, GTD will continue to meet its technology commitments for larger systems in IBM's product line."

It was also a banner year for sales of Office Products and General Systems equipment outside the U.S., Beitzel says. "For the third consecutive year, GBG/I has grown rapidly. The countries as a

A give and take on some headline issues

whole exceeded plans for 1977, and revenues and profits were significantly ahead of the previous year." With the addition of Colombia, Finland, and Norway last year, and Argentina this year, there are now GBG organizations in 21 countries outside the U.S. Those countries account for better than 90 percent of the GS and OP business overseas. In the others, OP and GS products are marketed through the Americas/Far East and Europe/Middle East/Africa organizations.

From a manufacturing standpoint, GBG has 19 facilities in 10 countries worldwide, operating at full capacity in support of marketing. "These plants," says Beitzel, "are run by managers who understand the importance of competitive manufacturing costs in today's environment."

"One of the major challenges in GBG is to come up with low-cost, high-volume products for a large and diverse customer base," he says. "This is very different from selling computers that may cost several million dollars. We've learned a lot about this low-end environment, and that's another reason why business has been good."

That's the kind of year it was. And what lies ahead? The three Group Executives are unanimous in the view that one should be bullish about the business. And not because the competition is not doing well, as Paul Rizzo says, "but the exact reverse. If they're doing so well, and we're doing so well, that tells us that the potential of the marketplace is a lot bigger than anyone thought it was."

"In terms of what we shipped in 1977, we set several records, records that we'll probably break quickly in 1978. So 1977 has been a very good year, by any standard."

"But if all things hold, the years ahead will make '77 look like a warm-up." □

It was, as Frank Cary saw it, "a good time for reflection." It was early December, and the IBM chairman had been invited by the New York Financial Writers Association to one of its occasional breakfast meetings. On hand were 25 reporters from the wire services and publications such as *Fortune* and *Dun's Review*.

In prepared remarks, Cary spoke with concern about the increasing costs of government, both in the direct form of taxes on individuals and corporations, and in the indirect form of regulations.

"Unless we make certain," he said, "that every cost is an efficient cost, we are risking higher and higher prices, the loss of more and more jobs, a decline in our standard of living, and, ultimately, the erosion of that economic strength that has made us preeminent in the world."

Certain proposed tax legislation, he said, "would cripple U.S. corporations in overseas competition." These measures include a weakening of the foreign tax credit and a repeal of the deferral of taxes on foreign earnings.

He spoke of the need for lowered tariff and nontariff barriers among nations and, at home, of the desirability of the Federal Government's intent "to remove some of the hobbles on American business."

"I'm convinced," said Cary, "that we've got to end our 20-year rush away from the marketplace and toward the government as the regulator of our economy."

When Q&A time came, Cary's responses ranged over many subjects. A sampling:

On U.S. trade relations with Japan:

"The best description I've seen of Japan is the title of the book that I read while I was there—*Japan, The Fragile Superpower*. They have an absolutely amazing economy based upon a wonderfully intelligent and hard-working people. They are terribly vulnerable to any kind of protectionism. They're concerned about this great confrontation between Japan and the United States. I think they really want to do something about it, but I think they're puzzled as to how to do it

without completely dislocating their economy. I think they will respond in the interests of protecting international trade."

On the Department of Justice suit:

"The case was brought nine years ago, and it's over two-and-a-half years old in terms of the plaintiff having the floor the whole time. We're champing at the bit to tell our side of the story."

"It has been a very, very long, difficult, and expensive situation not only in terms of money, but everybody's time and energy."

"I think there has been a kind of myth created in the minds of some people that IBM is in some way trying to keep this trial going on. We aren't. We are eager to get our side of the case in front of the court and get on with it because we're very confident of the outcome."

On trade: "We talk a lot about 'free trade.' There really isn't any such thing. There are degrees of freedom of trade. I think we're talking about fair trade. It is very, very important, not only to the United States, but to our trading partners and our allies and the whole rest of the world, that we are not misguided into thinking that we can be an island unto ourselves."

"There are 40 nations in the world with tariffs on data processing products that are twice as high as ours. I'd like to see them equal. I think that would be the ideal. But I think we have to face the fact of life that there are reasons for some of these impediments to trade, particularly if governments are trying to protect starting industries."

"The thing to focus on is the long-term prospects for the U.S. and the world to reduce the impediments to trade. That is the way the world will benefit the most." □

to think

Star White

I would like to compliment IBM and ABC for airing the program *Mary White*. [November/December.] We need showings of this quality. Young women need models to admire. I do hope quite a few constructive programs will be presented in the near future.

Sheila A. Donovan
Chicago, Ill.

Think

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The editors of *Think Magazine* will print as many letters dealing with the publication's content as possible, but reserve the right to edit all letters for reasons of space or clarity. No unsigned letters will be considered for publication.

Also ran

I very much enjoyed your "In the long run" article in the November/December issue. You mentioned that there were at least six IBM employees in the New York Marathon. I can add three more—all from IBM Owego: Ted Reeve, John Viksne, Fred Bostrom.

All of us completed the race and we all thought that it was a tremendous experience.

The picture of the runners crossing the Verrazano Bridge was outstanding. Thank you for an excellent article and for the interest you have shown in the Marathon.

Fred D. Bostrom
Vestal, N.Y.

And still more

In reference to the article on the New York City Marathon in the November/December issue—there were, indeed, more IBMers to finish that day. I completed the course in 3:07; Joe Maggi, SCD East Fishkill, finished in 3:13; and Tom Hogarth, SPD Poughkeepsie, finished in 3:22.

Moreover, on the previous day, another major marathon (2,400 participants) was held at Buffalo. The following employees of SPD Poughkeepsie finished this equally grueling race: Bob Rother, John Wilson, Jim Smith, Bob Wright, and Bob Schnell; and Bill Stahl (SCD Kingston).

In this year of the runner, marathoning is alive and well in the Mid-Hudson Valley.

Charles H. Van de Zande
LaGrangeville, N.Y.

Crystal-clear

Last spring I taught a course entitled "Introduction to Business" for Arapahoe Community College in Littleton, Colo. I gave each of my students in this class a copy of *Thoughts on the American Business System* [January 1977 special reprint], and we discussed the concepts involved. It proved a very worthwhile experience for the students, as well as myself, in gaining a more crystalized perspective on the free-enterprise system.

Harvey D. Rothenberg, Ph.D.
Arapahoe Community College
Littleton, Colo.

Déjà vu

In bygone days when my husband started with IBM, *Think* was a fantastic little black-and-white magazine, filled with beautiful pictures and articles that were of interest to others than company personnel. It was the kind of magazine you kept. I remember with fondness the page given to quotes of famous people.

However, the format changed and I lost interest. What a joy to find it returning to the interesting magazine it once was, with the added touch of color. This Christmas issue, with its beautiful cover, prompted me to write.

I am grateful to IBM for the fine TV programs and the interest this company gives to the arts, especially in funding the Cézanne exhibit.

Winifred Swingle
Binghamton, N.Y.

Cosmic error

[Re:] Your "Easy lies the head" article in September/October *Think* magazine. I liked your article and its insights into the leaders of SCD. However, I must comment on your second paragraph. The Westar satellite is owned and operated by the Western Union Telegraph Company, who is only authorized to provide domestic services. Therefore, the Westar satellite is not a cosmic go-between for Hursley and Kingston. Several of the International Record Carriers do provide service to Europe, using Intelsat facilities (satellites). Substitute Intelsat for Westar and you are correct.

N. D. Cowder
U.S.A. Data Communications
Center
Research Triangle Park, N.C.

Service call

Your excellent article on American Airlines [November/December] contained a box listing the IBM account team. To ignore the Field Engineering group at American Airlines is elitist nonsense, particularly in a piece extolling American's market leadership due to service.

I mean no disrespect to the fine marketing unit supporting American, but in my opinion "The Best of the Bunch" are FE National Account Manager

George R. Hill, Account Representative Wilbur Anderson, and 15 customer engineers and program support representatives.

John Bittman
Tulsa, Okla.

Suitable for framing

Think, a magazine that has always been a force of excitement, adventure and gauge of good things happening to and with people elsewhere in the company, has improved measurably over the last months. Our Brooklyn family anxiously awaits each issue.

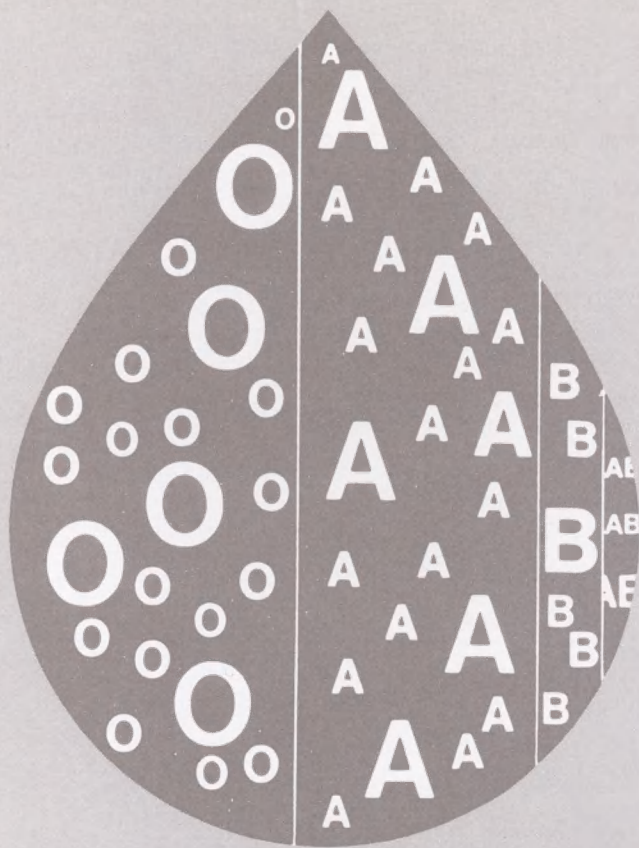
Why can you not refrain from putting any printing on the outside of the jacket with the exception of *Think*, month/year? This would allow one to frame the excellent photographs. The pictures are too interesting to discard after reading.

Hy Gear
Brooklyn, N.Y.,

(Editor's note: We're happy you like our covers. We've chosen, however, to follow the example of most business magazines, which highlight key stories with "cover lines." It's one way, we hope, to attract readers to what's inside.)

A knock or a boost

It doesn't matter which. So long as we hear from you. Weigh in with your opinions or ideas on next issue's letters page. Write: Editor, *Think*, 7-11 South Broadway, White Plains, N. Y., 10601.



Nothing to it

In terms of discomfort, that is. But there's a lot on the line in human terms when you give blood.

I always felt guilty every time the Red Cross Blood Drive came to IBM.

My conscience would bother me as I watched others take the time to give what they call the "gift of life."

Maybe I should give, I thought, but something would always come up to stop me: a meeting, a phone call, a deadline that had to be met.

Too busy, I rationalized. Maybe some other time.

Deep down, I knew that the meeting could have been rescheduled, the phone call could be returned later, the deadline could still be met, perhaps by working a little harder.

What, then, was the real problem? I'm chicken.

For many years, my excuse was that, as a college student, I had mononucleosis, which is infectious. And then, several years after that, I was exposed to infectious hepatitis.

But that was years ago. And now, in good health at the age of 39, I still had never volunteered.

Each time the Blood Drive people came, I read about how only 3 percent of the population supports the blood needs of all the rest of us. I read about

how we all have an obligation to be blood donors, if for no other reason than to protect our own families. I read about how fortunate we are to have the good health necessary to give blood.

And each time I would say, okay, now I *will* do it. And then there would be a meeting, a phone call, a deadline.

But the other day, it happened. The Red Cross people were here. I had seen the IBM Club signs. My secretary left a note on my desk: "George, I'm going to be downstairs for a while giving blood."

I was panic-stricken. It was a light day. No meetings. No crises. No critical phone calls. No looming deadlines.

And I felt fine. No cold. No sniffles. No illness or trouble of any kind. No reason not to give. In desperation, I searched for some reason, and I couldn't find one.

So down I went. They took me in without an appointment. It was easy: A few questions. Check your pulse, your temperature, your blood pressure. A nick of the earlobe to make sure you have enough iron. And then: "Okay, sir, just get up on that table."

The professional, full-time Red Cross nurses were very efficient. In just a few minutes it was over. And while it hap-

pened, I found out that, if you're healthy, your body does not miss the almost full pint taken out. The blood itself is replaced in less than 48 hours. And in six weeks' time, your blood system will have replaced all the cells and nutrients and other things your new blood needs.

I did pretty well for a rookie, the nurse said. The actual needle-in-the-arm, tighten-and-then-relax-your-fist part took only seven minutes. And then I was off the table and having a couple of cookies and a cup of juice. Within 45 minutes, I was back in the office with a little sign for my coat lapel that said, "Be nice to me. I gave blood today."

There was only one disturbing moment—when one of the nurses asked as she folded the tubes away, "How come, Mr. Clements, you never gave blood before?"

I didn't have an answer. There isn't any.

This piece was written by George C. Clements, while he was manager of information for the General Systems Division in Atlanta. He is now on a social service leave of absence as director of communications for the Martin Luther King, Jr., Center for Social Change in Atlanta.



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